THE AUSTRALIAN AND **NEW ZEALAND** JOURNAL OF SURGERY

UNDER THE DIRECTION OF THE EDITORIAL COMMITTEE OF THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

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JULY, 1938.

TABLE OF CONTENTS.

[The Whole of the Literary Matter in THE AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY is Copyright.]

ORIGINAL ARTICLES—	PAGE
THE GEORGE ADLINGTON SYME ORATION: SURGICAL TEACHING IN GERMANY W. A. Osborne	5
PRESIDENT'S ADDRESS Sir Louis Barnett, Kt., C.M.G.	13
THE FIRST BOOK ON SURGERY TO BE PUBLISHED IN VICTORIA K. F. Russell	17
PROSTATIC OBSTRUCTION Julian Smith, junior	19
THE TREATMENT OF URAMIC INTOXICATION COMPLICATING PYLOBIC STENOSIS WITH VOMITING	37
A REVIEW OF ONE HUNDRED CASES OF CANCER OF THE STOMACH F. Gordon Bell	57
A Brief Review of Functional Hyperinsulinism, with the Report of a Case J. Maxwell Clarke	66
GAS ANÆSTHESIA: A CRITICAL SURVEY OF GAS ANÆSTHETIC TECHNIQUE Douglas G. Renton	74
THE ÆTIOLOGY OF PHLYCTENULAR OPHTHALMIA Sir James Barrett	80
SURGICAL TECHNIQUE—	
A METHOD OF EXTRACTING SECONDARY CAPSULAR CATARACTOUS MEMBRANE R. Granville Waddy	81
CASE REPORTS—	
A SUGGESTED AID IN THE TREATMENT OF CLEFT PALATE IN OLDER CHILDREN OR ADULTS	82
Extreme Disfigurement Resulting from Operation on Frontal Sinus, Corrected with Graft of Rib Cartilage	85
PRIMARY CARCINOMA OF THE JEJUNUM: REPORTS OF TWO CASES Alan E. Lee	88
EDITORIAL-	
THE NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL	91
SURGERY IN OTHER COUNTRIES-	
THE FORMATION OF AN OPENING IN THE ARTICULAR CAPSULE IN INTERMITTENT HYDRARTHROSIS OF THE KNEE	93
CLINICAL AND ARTERIOGRAPHIC DIAGNOSIS OF TEMPORAL LOBE TUMOURS	93
THORACOPLASTY WITH EXTRAFASCIAL APICOLYSIS	95
THE IMPROVEMENT OF RESULTS OF PROSTATECTOMY	98
С	

REVIEWS—	PAGE
REGIONAL ANATOMY	98
Physical Diagnosis	99
A HISTORY OF ORTHOPÆDIC SURGERY	99
Genetics	100
WORK AT THE MAYO CLINIC	100
EXAMINATION OF THE URINE	101
EXPERIMENTAL SURGERY	102
RECTAL SURGERY	102
PROCEEDINGS OF THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS-	
Hydatid Registry	104
ELEVENTH ANNUAL GENERAL MEETING	105
Annual Business Meeting	107
HALF-DAY MEETING ARRANGED BY THE COMMITTEE FOR THE STATE OF VICTORIA	111
WESTERN AUSTRALIAN ANNUAL MEETING	111
VICTORIAN EVENING MEETING	112
NOTICES—	
THE BRITISH POSTGRADUATE MEDICAL SCHOOL	112
NEW DEVELOPMENTS IN SURGICAL EQUIPMENT	112
EDITORIAL NOTICES	112

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THE AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY

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JULY, 1938.

No. 1.

THE CEORGE ADLINGTON SYME ORATION.'

SURGICAL TEACHING IN GERMANY.

By W. A. OSBORNE, Melbourne.

The George Adlington Syme Oration was founded to perpetuate the memory of the late Sir George Syme, surgeon, of Melbourne. Syme was in many, but not all, respects the product of his age and particularly of his professional environment, which at that time did not produce investigators. I always found him appreciative of new ideas, and on one occasion when a research worker in my laboratory was finding advancement in his profession handicapped by the unreasoning hostility of medical graduates of the old school, Syme came forward with generous championship. It is, however, as a practising surgeon that Syme is honoured: one who did his best, who never spared himself; one who hated the slipshod and was fearless in the expression of the faith that was in him. As one of the professorial staff of the Melbourne University, I should like also to pay a tribute to the long and useful service which Syme performed as a member of the governing body or Council of our University.

"When at some future day, our period of civilization shall lie, closed and completed, before the eyes of later generations, German theology will stand out as a great, a unique phenomenon in the mental and spiritual life of our time. For nowhere save in the German temperament can there be found in the same perfection the living complex of conditions and factors—of philosophic thought, critical acumen, historical insight and religious feeling—without which no deep theology is possible."

So wrote Albert Schweitzer, proud of the pre-eminence of his countrymen in a field in which he had worked with some measure of success. But I can imagine Germans in other avenues of effort making the same proud boast: "When at some future day, German chemistry, German botany, German zoology, German pathology, German mathematics, German philology, German archæology will stand out, and so on." Will the same claim be admitted for

¹ Delivered at the eleventh annual meeting of the Royal Australasian College of Surgeons, held in Sydney, March, 1938.

German surgery. Certainly not, as far as non-Teutonic critics are concerned, and I doubt if the most patriotic German today would regard his countrymen as having consistently outshone all others in the art and science of surgery. There was a time when German surgery was far behind that of Britain and France, and histories of surgery written by Germans frankly admit this. I now find, however, that though the leeway was made up about a hundred years ago, there still remains a tradition that German mentality does not lend itself to the prosecution of surgery, and, further, that there is actually

in the German a lack of the requisite manual skill.

In the eighteenth century, though Germany produced great pioneers in anatomy, physiology and embryology, her surgery was crude. The military surgeon was a barber and was expected to shave the officers, and could be flogged if he did this clumsily. His chief treatment of the wound was to apply a salve to the offending weapon—perhaps the best place for it. In the early nineteenth century, however, there came a wonderful bourgeoning of surgery in Britain, with names that are now household words. France, too, witnessed an improvement, especially when Napoleon Bonaparte, as First Consul, reformed the teaching and raised the social status of the military surgeon, thereby effecting a change in the surgeon's social position which John Hunter had done so much to bring about in Britain in the mid-eighteenth century. In the eighteenth century, if a nobleman thought himself insulted by a physician, he sent a challenge, and that matter was settled as between gentlemen. But if a surgeon acted in the same way, it was only vulgar abuse, indicating a thrashing by his lordship's lackeys. During this flowering period we hear little of Germany's contribution, despite the fact that she produced von Graefe and Dieffenbach, the founders of plastic surgery, and also one of the world's greatest surgeons from the standpoint of digital skill and speed, namely, Konrad Johann Martin Langenbeck. It is curious and amusing to find in medical literature one hundred years ago the doubt expressed whether any real progress in surgery was to be expected. It was thought that there was a limit to the speed at which fingers could carry out skilled action, and that that limit had probably been attained. Paganini had shown what was possible with the violin, and probably the rapidity of his fingering has never been equalled; but Langenbeck, of Göttingen, was the Paganini of surgery, displaying speed of action which was the admiration and despair of pupils and colleagues.

In view of Langenbeck's adroitness and the contributions of such great surgeons as Theodor Billroth, Wölfler, Thiersch and Esmarch, it might be regarded as a waste of time in combating the idea that the German surgeon lacked the deftness of his British and French colleagues. Yet when I was a student it was the current opinion in England, and I have come across many vestiges of it still remaining. It seems illogical to admit supremacy of the Germans in glass-blowing, in clock and toy manufacture and in the making of microscopes and field glasses, and imagine that they cannot be skilled in surgery. Why, the internal combustion engine where vapour is exploded is associated with the names of Otto and Daimler, whilst the improved engine in which non-volatile oil is burned we owe to Diesel. Printing was a German invention, and most improvements in the process have been contributed by Germans. Coming down to the humbler art of the modern barber, we find in the mid-nineteenth century the crude British methods

having to give way to the neater and daintier German technique.

Mere manual dexterity is after all only a minor essential in the equipment of a good surgeon. I have received from various British and American surgeons generous tributes to the eminence of their German colleagues. I give, however, a few opinions which are less enthusiastic.

One of America's veterans:

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I have not visited Germany since the War and curiously enough I have no desire to do so. The impression gained by some excellent surgeons, friends of mine, who have recently returned from there, was that the standard is very much lower than it was in pre-War days, and that it will be a long time, if ever, before they can get back to that standard under the present management.

As the letter goes on to state that the writer will end in the poorhouse if the Roosevelt administration continues, I suspect a little political bias here.

A well-known English professor of surgery:

I have not visited German medical schools for the last six or seven years, and the last time I went I had not much opportunity for estimating their methods of teaching, for my visit was paid as a member of a surgical club, when operations and demonstrations were staged especially for us. My impressions of the technique of German surgery, however, are very favourable, and I think that Tübingen is probably one of the best clinics.

A distinguished American surgeon:

I have always thought that the German surgeon paid less attention to the individual and more to the lesion than our American surgeons do, and that sometimes they were much more radical and much more careless in the individual case. However, this has resulted in advances in surgery as a whole at the expense of individuals.

Another American surgeon, not so distinguished, assured me that he preferred the conservative surgery of the Germans, particularly as regards the distal portion of the alimentary canal, to the radical English methods.

Last year it was my good fortune to revisit Germany and seek out the schools of learning where forty years ago I spent three of the happiest years of my life. I fear it would be out of place in this address to describe the strange emotions which possessed me when I wandered through the old-world streets where once I had my daydreams. Sometimes I felt as a ghost is supposed to feel. Whilst in Germany I naturally made physiology my special study, but I never omitted to get in contact with the departments of surgery, and, thanks to letters of introduction given to me by a distinguished Fellow of this College, I made acquaintance with a number of Germany's leading professors of surgery. I interrogated each professor and examined each department as thoroughly as politeness allowed. Certain personalities remain in memory on account of the deep impress they made:

A. Young, vivacious, a social success and obviously sought after as such. Effusive in his praise of anything a hostess brought to his attention. A clear expounder, with a rich vocabulary. I did not see him in the theatre, but I heard he was a better expositor than operator.

B. Elderly, thin, well-dressed, calm, courteous, but capable of a rebuke all the more effective through his reserve. Exposition slow and a little dry. As operator, careful, but in my opinion not inspiring.

C. Bullet-headed and burly, loud raucous voice, a flaming patriot; "Heil Hitler" placarded in the hospital corridors. Greeted by each patient with outstretched arm and loud "Heil Hitler". Manners of a drill sergeant. No great effort made to disguise the fact that my visit was somewhat of a

nuisance. I thought to myself that the patients were to be pitied. How could those coarse fingers delve into living tissue without hurt? I saw him operate—a Gasserian ganglionectomy—and the operation was a triumph of artistry and craftsmanship. I went away wondering.

D. Age about sixty. Once a very handsome man, I imagine. Somewhat temperamental, worshipped by nurses, courteous and kindly. Exposition beautiful to listen to—a poet I have no doubt. I heard he has off-days. I am glad I saw him in good form, and it was a delight.

E. It took me a few minutes only to realize that I was in the presence of a great man, and this through intuition, for a finer modesty I have not seen. Sometimes the eyes were those of a visionary; at other times they were those of a mechanic and master of technical detail. It was my good fortune to spend some time examining the creations of his brain. Had I met no one but him, my visit to Germany would have been worth the trouble.

I give these impressions to assure you that the personality of the surgeon varies in Germany as much as in other lands, and is by no means moulded and disciplined into a stereotyped form. Many who have only a shallow acquaintance with Germany are apt to think that standardization of university courses suppresses personality. As a student, I found to my surprise that the reverse was the case. When a German university draws students from adjacent states and countries, it will be found that the attractive force is not in the building or equipment or even in the tradition, but in the personality of the staff.

CHARACTERISTICS OF GERMAN SURGICAL TEACHING.

Certain conclusions about surgical instruction forced themselves upon my attention during my sojourn in Germany.

(1) I was much impressed by the material equipment for teaching medical students to be found in the surgical clinics. The lecture theatres were spacious and almost lavishly endowed with appliances useful in Every device for illustrating the lesson by lantern slides, exposition. diagrams, skiagrams and cinematographic films was employed. Histological sections of tissues, removed a few minutes before from the patient, could be projected greatly enlarged on a screen. The students' comfort was remembered in excellent lavatories and cloak rooms, not merely furnished with physical necessities, but artistically decorated. I dwell upon this particularly, as there is a most unfortunate tendency in Australia to think that the student should be given the minimum of space and money. "What has a lecture theatre got to do with the healing of the sick?" is a foolish question often asked. At one Australian legislative house, when the hospital function of teaching medical students was mentioned, there was an expression of dissent from more than one member. Surely a little thought would convince even a member of Parliament that the best equipped hospital in the world would be useless unless there were trained men to direct its activities. A skilled surgeon in a bad hospital can still do good service; an unskilled man in a good hospital would be a menace. Add to this argument the well-known fact that patients the world over are treated better in a hospital that teaches, where the physicians and surgeons are on their mettle, for the student is a merciless critic. Teaching facilities therefore should not merely consist of the minimum sitting or standing space, but should include every obtainable device for

illustrating each case, and, further, the students' health and comfort should be effectively safeguarded. I sincerely hope that the Australian public will regard expenditure on the teaching side of a hospital as well-spent money.

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(2) I found the practice and the teaching of surgery in Germany strongly based not only on anatomy, but on physiology and pathology. The student naturally gets a good grounding in these fundamentals, but I could clearly see that the surgeon was thinking along physiological and pathological lines. In my humble opinion, Joseph Lister is memorable not only for the introduction of antiseptic surgery, but as marking the end of an era when the surgeon was an anatomist only. Whether Lister was a good anatomist I really do not know, nor do I imagine that it matters much whether he was or was not. What does matter is that Lister was a distinguished physiologist who gained the Fellowship of the Royal Society of London through his physiological researches years before he thought of antisepsis. That the surgeon of today should have an intimate acquaintance with the morphology of the human body is an axiom which no one will dispute, but it is not so freely admitted that whilst he operates he is thinking of function as the directing consideration in all that he does. Wrong function is called pathology, and the surgeon endeavours to restore right function, or as near to this as circumstances allow. In recent years, the border-line between physiology and pathology has been increasingly difficult to demarcate. The two sciences flow into each other, and the modern surgeon surveys the combined fields.

I do not wish to say anything in disparagement of British surgery—I am certainly not qualified to speak on the technical side—but I believe I have found in the outstanding American surgeons of today a greater emphasis being placed on physiological and pathological principles. And I would venture in no unkindly spirit to give my opinion, for what it is worth, that the German surgeons in this regard are superior to the American.

(3) I believe I am right in stating that a change has come over surgical teaching in Germany in the last few years. It certainly has since my student days. Formerly the professor of surgery had a mentality dominated by his researches. He loved a promising pupil, but training the general practitioner was often a routine perfunctorily and not very successfully performed. I was very struck on my recent visit by the surgical instructor leaving the Olympian heights of research and meeting his average student on the latter's plane of thought, and with sympathy for his outlook. In more than one Klinik I heard the opinion and saw its practice, that whilst a large body of students in an operating theatre certainly learn something about the surgical technique, the number who can get the best out of the operation is not greater than four. The large theatre is best suited for the didactic exposition before and after the operation. Another change is that a finicky numerical accuracy is no longer forced upon the student. I remember a young resident getting a sad "strafing" for describing a gall-stone as being as large as a pigeon's egg. He was fiercely ordered before a theatre of students to give the dimensions of its two diameters in millimetres and state whether it was an ovoid or an ellipsoid!

(4) As our law expressly forbids any surgical procedure being carried out on a lower animal for the purpose of acquiring skill, experiments on animals cannot be employed in surgical teaching in Britain or in this Commonwealth. This means that our surgeons must acquire operative experience on the living human being only. As students and young graduates have the limitations of mortal men, their mistakes must therefore take place in the living human body. I feel it is useless to dwell on this topic, because the forces of reaction in our community are powerful, and an unscrupulous propaganda has so misled the public that a reform in the near future is unlikely.

THE SURGICAL KLINIK IN TUEBINGEN.

On revisiting Tübingen, where I was a student forty years ago, I early discovered that the university and town regarded the surgery *Klinik* with especial pride. The bold stroke had been made of leaving the cramped and costly area of the town and advancing out into the country, where space, pure air, silence and a lovely prospect were obtainable.

On October 30, 1935, this great university Klinik of surgery was formally opened with colourful ceremonial. Five years of cooperation between a great architect and a great surgeon had produced this masterpiece. Despite financial depression, the good people of Württemberg had gladly donated five and one-tenth million Reichsmarks, equivalent to £A.517,608, of which two and one-fifth million Reichsmarks were spent on the external construction. Special mention should be made of the fact that there was no borrowing.

As was well said at the opening ceremony, this, the last word in surgical hospital construction, was the outcome of experience, skill, patience and persistence; but, above all, it arose through the genius of a surgeon. I had intended not to mention the names of the living in this address, but I cannot refrain from paying a tribute of profound respect to the eminent surgeon whose labours have been crowned with triumph, namely, Professor Kirschner, who as professor maintained and advanced the Tübingen tradition established by such masters of surgery as Viktor von Bruns, Paul von Bruns and Georg Perthes. The noble beauty of the building, the perfect artistic composition of the high aspiring, central block, with its widespread wings, the red and white coloration, the gardens around it, and the glorious view of the Swabian Alps, with their forests and romantic castles, do honour to the artist as well as to the craftsman. The proud boast was made that Tübingen had transcended every surgical clinic, not only in Germany, but in the world. Would that all our hospitals took equal heed of the use of beauty in the healing of the sick!

To give a detailed description of the Klinik would require more time than is at my disposal and more architectural knowledge than I possess. Let me give a few outstanding impressions. The building is remarkably symmetrical; indeed, I was often reminded of a crystal aggregate. On either side of one main axis, the west side is reserved for men, the east for women and children. There are nine divisions, each with thirty-three beds. The operating departments are on the eighth storey, and are in two groups separated by common wash-up rooms. Each group consists of two operating theatres, with instrument and sterilization rooms between, that is, four theatres in all. There are other and smaller operating theatres with X ray equipment to guide the surgical procedure. The theatres are lined and floored with marble capable of being thoroughly hosed down, while switches and electric buttons have protecting gables. Electrically controlled blinds cut

out direct sunshine if need be, and there are also electrically controlled rollers for making any desired portion of a window opaque. The air is conditioned. Professor Kirschner advised 25° C. for temperature and 55% for relative humidity. The humidity can be reduced, if necessary, to 43%. The air-conditioning is regulated for the size of the audience, the weather and the presence of volatile substances, such as anæsthetics and antiseptics, in the air breathed.

The main lecture theatre, two floors in height, is on the fifth storey, and has many novel features. Students are admitted by a sound-proof stair. Beneath the seats is a museum. Smaller rooms are close by, with models, diagrams, lantern slides and all the paraphernalia of teaching. One curious feature is that the lantern operator is acoustically isolated from the lecturer. The theatre has beauty as well as every device for demonstrating. There is a smaller theatre accommodating sixty students. The water supply to the Klinik is artificially softened, and this is, of course, necessary, as all ground water in the Neckar valley is unusually hard. The electric signal system for summoning members of the staff is quite new and most ingenious. I regret I am not sufficiently versed in electrical science to describe its peculiarities of design.

The therapeutic aid of air and sunshine is enlisted. There are huge verandas connected with the wards, and beds can be wheeled out through the ample windows without disturbance to the patients. There are also sun terraces and a beautiful garden for convalescents. Heliotherapy has, of course, its complete equipment, as also ultra-violet therapy. Baths, including mud baths, are of every sort and design.

Films, both archives and store, are on the tenth or top storey. Should a fire break out, the roof is designed to lift automatically with the explosion. The rooms for taking and developing X ray pictures show many quite new devices.

The kitchen arrangements, as in all modern hospitals, are on the ground floor. This was the only department in which I did not find approach to perfection, for some smell escaped. I may mention incidentally that the best kitchen organization I have seen is in the new Birmingham Hospital, and here the architect had the experience of Messrs. Lyons's establishments at his disposal. The library, as might be expected, is well designed, and I was interested to find a well-equipped gymnasium.

Whilst it is true to say that the great Tübingen Klinik is designed for the best possible surgical treatment of the patient, the students' needs have been kept in mind, and I wish the Australian hospitals would have the courage and the good sense to follow this lead.

As you have doubtless surmised, I spent some time studying the detail of this great Tübingen Klinik, and feeling a reflected pride in that my old university was leading the world, at least in surgery. There was one fly in the ointment. Professor Kirschner, the inspirer of all this, was no longer in Tübingen, as he had taken the professorial chair of surgery in Heidelberg. So to Heidelberg I went. I wish it was in my power to convey to my audience the surprise I experienced. I left Tübingen convinced that I had seen the last word in surgical hospital construction, not excepting the great hospitals of the United States of America. I assure you I rubbed my eyes when I beheld at some distance from the city of Heidelberg a new and

wonderful surgical Klinik, newer, brighter and better than that in Tübingen! Professor Kirschner had experimented in Tübingen. Some of the experiments were successful and these he repeated; some were unsuccessful or dubious and these he avoided. For example, he reduced the number of storeys from ten to eight. But this was not all. The Heidelberg surgical Klinik is only part of a vast hospital centre—I might say, of a hospital city. The surgical part is complete, but the rest is only a plan. Professor Kirschner, with great kindness, expounded his glorious daydream with the aid of a large model. All the various hospital buildings for medicine and surgery and all the hospital specialties-eye, ear, nose, throat, mental, women, children, fever et cetera—are grouped into one coherent whole, and alongside is the medical school with all its departments similarly coordinated. Should Heidelberg finance this magnificent project, and I hear there is every hope that such will be done, then I have no hesitation in declaring with confidence that Heidelberg will have the foremost medical school in the world, for it will unite American initiative, ingenuity and organization with those qualities, profundity of thought and painstaking, patient thoroughness, which are the prerogatives of the German.

It may be asked if Germany has suffered or is likely to suffer from the imposition of her racial and political tests. This is a delicate matter, but I give my opinion for what it is worth, and this is, that whilst Germany will lose something in research in philosophy, science, scholarship and mathematics, and in the more scientific aspects of medicine, she may not lose anything in surgery. I foresee one danger only, and this arising from the economic condition, that the purchase of foreign books and periodicals may become increasingly difficult. Still, the economic position may improve, the publication of original matter may be simplified, or some other and unexpected solution of the problem may present itself.

May I conclude on a note of advice which I give with diffidence to an assembly of this character. You have retained the best of British traditions, and you have copied and applied the best you could find in America. May I ask you to turn your eyes also towards Germany. Sufficient acquaintance with the language to read technical literature is easily acquired. The universities of Australia make such knowledge obligatory with those qualifying for the degree of Bachelor of Science. Our universities ought to make it obligatory for the Bachelor of Medicine. The Australian schools retain the unfortunate heritage of teaching a French which gives the pupils nothing of what France has to offer in artistry of language and crystal clarity of expression. Far better that our schools taught German, which, apart from its closely allied literature, is the portal to a domain of transcendent scholarship. The scientific chemist of today finds German a necessity. I shall not be surprised if in the very near future the same necessity is forced on the surgeon.

PRESIDENT'S ADDRESS.

By SIR LOUIS BARNETT, Kt., C.M.G., Dunedin.

As a New Zealander representing the New Zealand Fellows of this College, I extend to you all, you citizens of this great and progressive Commonwealth, greetings and good wishes on your one hundred and fiftieth birthday. The whole family of the British Empire is proud of its big strong capable brother, Australia. We in New Zealand are not exactly juvenile either, for we celebrate our one hundredth birthday in two years' time, and we hope that a goodly number of Australians will on that occasion give us the pleasure of their company.

It is true that we are separated from one another by the obstacle of twelve hundred miles of ocean, ocean that belies its name Pacific and is, therefore, called the Tasman Sea; but our modern ships are fast and comfortable, and soon adventurous travellers will have the alternative of a very speedy trans-Tasman crossing by air.

PROGRESS OF THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS.

The full story of the College activities during the past year will be told by our secretary, Mr. H. G. Wheeler, at the business meeting of the Fellows, and will be published in due course in our journal. My presidential remarks must be brief, because this item in the programme has a fifteenminute time limit—a wise precaution, particularly in the case of elderly presidents.

Our College was born in the year 1927, and so is now only eleven years old, but it has been a sturdy and well-nourished child, and I think its parents can be justly proud of its rapid growth towards useful manhood. I think, too, that these parents can claim that they have been successful in bringing up their child as all children ought to be brought up, not thinking of themselves alone, but placing kindly and helpful service to others before their own individual needs.

As regards mere numbers, you may be interested to know that there are now on the College roll 617 Fellows, distributed as follows:

New South Wales			 	 		 	
Victoria			 	 		 	 169
New Zealand			 	 		 	 126
Queensland			 	 		 	 53
South Australia							43
Western Australia			 	 		 	 24
Tasmania						 	 14
Federal Capital Te	rrit	ory	 	 		 	 2
Norfolk Island			 	 		 	 1
Overseas			 	 	0.0	 	 10

¹Read at the eleventh annual general meeting of the Royal Australasian College of Surgeons, at Sydney, on March 23, 1938.

In addition, 17 Honorary Fellowships have been conferred upon eminent surgeons and scientists who have attended our meetings and have been

prominently associated with our work and development.

Since our last annual meeting, our immediate past president, Sir Robert Wade, of Sydney, was made the recipient of the Honorary Fellowship of the Royal College of Surgeons of England, a high and well-merited honour, on which we all heartily congratulate him. This welcome appreciation of the personality and surgical status of our past president forges another link in the chain that binds us in goodwill and friendly cooperation with the English College.

As you perhaps know, the Australasian Fellowship cannot now be obtained unless the candidate possesses one of the few higher surgical academic qualifications that include a test of special proficiency in the

fundamental subjects of anatomy and physiology.

The English College conducts what is called the primary examination in anatomy and physiology for its Fellowship, and of late years has made arrangements with the Australasian College whereby this particular examination can be held in Australia and New Zealand for the convenience of such students as wish to obtain the English Fellowship as their higher surgical qualification. This obviates the necessity of travelling to England to sit for the primary examination, but for the final or surgical part of the test a sojourn in London is still essential. Last December, 41 Australian and 14 New Zealand candidates sat for this examination, and 27 of them were successful. It is a stiff examination, and the 50% of passes is considered very satisfactory, being well above what is regarded as the average in England.

Many, perhaps the majority of, candidates pass their primary examination comparatively early in their student days, and are thus, whilst still in their callow undergraduate stage, fired with the ambition to become surgeons. This happened to me personally, but all the same I have doubts as to the wisdom of the procedure. Multiplicity of surgeons and misfits is thereby encouraged, and I have come, in the course of long years, to the opinion that the choice between surgical and medical practice should be made after.

and not before, graduation.

The Royal Australasian College of Surgeons has this main object in view: to provide for people of all classes, rich, poor or intermediate, a surgical service that shall be adequate, efficient and ethical. The making of a competent surgeon involves a long and diligent apprenticeship at an approved hospital for years after the mere graduation examinations have been passed. That is why our College keeps a very watchful eye on the staffing and teaching organization of our main hospitals. We all know that the welfare of the patient is the prime consideration of hospitals, but what is not so well recognized is the fact that the hospital patients' welfare and the private patients' welfare too are absolutely dependent on the service of a properly educated and properly trained medical staff, and that this essential education and training can only be provided after graduation and in a properly organized teaching hospital.

Our College has very definite views on the surgical staffing and the surgical organization generally of hospitals, and, in New Zealand at any rate, these views, which have been published in the form of a report and recommendations and circulated to all hospital boards, are obtaining wide recognition and approval. One vital principle is that surgical staff appoint-

ments should be made on the recommendation of an expert advisory committee and should not be dependent on the verdict of lay members of a hospital board, who, no matter how conscientious, business-like and well-meaning they may be, cannot have the professional knowledge required for judging the comparative fitness of a candidate for the responsible duties of a surgeon.

As a gratifying example of enlightenment in this connexion, I might mention that, to its credit, the Auckland Hospital, the largest in New Zealand, has come into line with most of the main hospitals in Australia and New Zealand, and now follows the advisory committee plan in making important staff appointments, and quite recently Sir Donald McGavin, our honorary secretary in New Zealand, was definitely appointed by the Auckland Hospital Board to represent the Royal Australasian College of Surgeons on one of its advisory committees.

Another point worth mentioning in the New Zealand report I have referred to concerns an offer made by the New Zealand section of the College to the Health Department of the Government, to inspect and report on hospitals from the point of view of surgical efficiency. This offer has been gratefully accepted, selected Fellows have been given official status as inspectors, and the desired surgical survey has already begun.

A notable milestone in College progress was reached last year when the Prince Henry's Post-Graduate Hospital was declared open at Melbourne by Professor G. Grey Turner, the distinguished director of post-graduate surgical teaching at the London University. In this partly new and wholly modernized hospital of three hundred beds, post-graduate training of a very high standard will soon be in full swing, and to help those in straitened circumstances to avail themselves of the advantages provided, it is proposed to establish the necessary scholarships.

Here in Sydney I have had the pleasure of being shown over your Prince Henry Hospital, which it is intended shall serve for post-graduate teaching in this city. This fine block of buildings, now in process of reconstruction and extension on a spacious and beautiful coastal site reasonably accessible from Sydney, offers exceptionally favourable opportunities for development as a post-graduate school. The preliminary work in connexion with its establishment has been carried out by the Government and by the Sydney University. Our College is fully alive to the advantages such an organization presents in the training of surgeons for the vital responsibilities of their career, and intends giving its support and wholehearted cooperation in its successful evolution. This development of an institution for post-graduate medical education on a scale of such gratifying thoroughness is a matter for warm congratulation to all concerned.

In Melbourne, centrally situated in the vast expanse of Australasia, the College has wisely built its home and established its headquarters, and those members of the College Council who live in Melbourne have wisely been appointed the Executive Committee. We are very fortunate in the personnel of our executive and their secretarial staff. Their devotion, their industry, and their personal influence in winning generous support from the leading State and municipal officials and from the citizens, have been, and continue to be, of inestimable value to the College.

It is felt desirable that here, in Sydney, a local executive should function on somewhat similar lines. This committee or subcommittee would have its own secretariat, would link up with the central executive at Melbourne, and would thereby add to its efficiency and usefulness to all the various units of the College throughout Australasia.

Our College is not only concerned with present-day standards of surgical efficiency. It seeks to encourage progress and to provide an ever-improving surgical service to the people. The Australian and New Zealand Journal of Surgery, published quarterly by our College, has a deservedly high reputation in the scientific world. Our library is growing apace, and provides Fellows with excellent facilities for the study of the world's best books, monographs and magazines dealing with surgical topics. The benefits of this comprehensive library is not limited to the Fellows resident in Melbourne. Literature is freely and gladly loaned to any Fellow applying for it, no matter where his home may be in Australia or New Zealand, and if the publication desired is in a foreign language which the Fellow himself cannot understand, a competent library official translates it for him.

Special lectures are arranged and meetings held periodically by all the various sections of the College for the discussion of papers and problems and for the demonstration of clinical cases and operative procedures. Surgical research, both laboratory and clinical, is encouraged and the necessary facilities are provided, sometimes with the inclusion of financial aid in the form of scholarships. The collective investigations of certain diseases that are rife in our countries, such as cancer, hydatid infection and goitre, are examples of research work undertaken by the College, and there are many others.

The establishment and maintenance of the very numerous College activities have naturally been costly. Much money has been spent and much more is required to enable the College to carry on its great programme of surgical service. We have had in the past generous support in part from lay friends and sympathizers, but in the main from our own surgical colleagues, notably the munificent bequests of the late Gordon Craig, of Sydney, one of the Founder Fellows of the College, and of the late Sir George Syme, of Melbourne, our revered first president. To many others we are deeply grateful for liberal gifts in money or in kind.

It is a great satisfaction to us to know that we have so many friends and to feel that our future prospects are so bright. We are all human, and consequently all make mistakes. Our achievements may fall short of our ideals, but I would like you to believe that, above all else, the main reason for our existence as a College of Surgeons is to give better service to our fellow men.

THE FIRST BOOK ON SURGERY TO BE PUBLISHED IN VICTORIA.

By K. F. Russell, Melbourne.

The first book devoted to surgery to be published in Victoria, and one of the first to appear in Australia, was a thin octavo volume of 168 pages, published by George Robertson, Melbourne, in 1859. Its author was James G. Beaney, M.R.C.S. (Edinburgh), and its title was "Original Contributions to

the Practice of Conservative Surgery". The title page of the book forms the illustration to this paper, and, as will be seen, it informs the reader that the book is "a selection from the surgical cases occurring in the practice"

of the author.

Beaney dedicated the book to James Syme, Professor of Clinical Surgery in the University of Edinburgh, "in grateful recognition of that teaching which, as a pupil, it was my privilege to receive from you, and of the ability with which you have laboured to demonstrate that the sufferings of humanity can be mitigated by conservatism in the practice of surgery".

The book met with a very mixed reception, and Beaney was accused by the reviewer in the local medical press of advertising to the public his skill as a surgeon. Be that as it may, the book is of great interest even now, for it tells us of the type of cases met with in those days, of the difficulties of surgery in the

era before Listerian principles were adopted, and, above all, of the advantages which anæsthesia had brought to surgery.

In the first chapter of the book, Beaney gives a description of the first excision of the hip joint performed in the colony. The patient was a girl, aged twelve years, whom Beaney first saw on July 24, 1858, and who was suffering from a tuberculous hip joint, as a result of which discharging sinuses developed. His first treatment was to extend the affected leg by laced

ORIGINAL CONTRIBUTIONS

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PRACTICE OF CONSERVATIVE SURGERY;

REING A SELECTION FROM THE SURGICAL CASES OCCURRING IN

JAMES G. BEANEY, M.R.C.S.E.,

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MELBOURNE:

GEORGE ROBERTSON, 85 & 87 COLLINS STREET BAST; AND 3 AMEN CORNER, PATERNOSTER BOW, LONDON. MBCCCLIX. bandages applied above the knee. Under chloroform anæsthesia he then opened up the sinuses to allow free discharge, but, as this proved unsuccessful, the general condition of the patient becoming worse, he decided, on October 6, to excise the joint.

When the anæsthetic influence of chloroform had been sufficiently induced, I made an incision five inches in length, commencing two inches above and terminating three inches below the trochanter major. This opening gave vent to a large quantity of ichorous-looking pus, which flowed from beneath the tensor vaginæ femoris. On fully exposing the articulation, the head of the femur was found in the cotyloid cavity, attached by recent adhesions. In dissecting it out, it broke off by the neck, presenting a vermiculated appearance, from ulceration and interstitial absorption. The diseased parts were now readily turned outwards and the bone sawn through immediately below the trochanters. Two inches more, however, of the shaft of the femur required excision—in consequence of the softened condition of the bone and medullary canal—before the whole of the diseased mass was removed. The acetabulum was healthy, and very little blood was lost during the operation. The edges of the wound were brought together, and the patient placed in bed.

The subsequent course was more or less uneventful; there was discharge of laudable pus and some spicules of bone. The patient eventually became much improved in health, and Beaney reports:

She has considerable mobility of the joint, and is able to walk about with a high-heeled shoe, made for her by Jones, of Lonsdale Street.

Other chapters in the book are devoted to chronic hydrarthrosis, obstruction of the bowels with tympanites, obstructive dysmenorrhæa, neuralgia of the epididymis, varicocele, abscess of bone, traumatic stricture of the urethra, excision of the maxillary bones and, lastly, a long chapter on anæsthesia.

In the chapter on excision of the maxillary bones, Beaney describes two cases in which he excised portion of the maxilla for osteomyelitis of the bony alveolus. For this operation he used an incision through the cheek. He also describes several cases of chronic abscess of bone, in one of which he trephined a hole over an abscess of the tibia with excellent results.

The concluding chapter on anæsthesia is excellent. It is really a monograph on the subject, as it deals first with a short history of anæsthesia, then the various agents used, their mode of manufacture and administration, the dangers and pitfalls of anæsthesia, and finally the preparation of the patient before administration, and the care of the patient during and after the anæsthetic.

In addition to this book, Beaney published two others. The first was "Syphilis, its Nature and Diffusion Popularly Considered", and was published in Melbourne by George Robertson in 1869. This book is of interest, as it contains coloured lithographic plates, which were among the first produced in Melbourne. The other book was published anonymously in 1876, being entitled "Lithotomy, its Successes and its Dangers, being a Verbatim Report of an Inquest Held before the City Coroner". This book is the report of an inquest in which Beaney was accused by some fellow practitioners of killing a patient during a lithotomy. He was discharged by the coroner with a clean sheet, and this book was his retort to the profession, for in it he exposes the whole acrimonious and at times libellous discussion that took place at the inquest.

Needless to state, the publication of this latter book did not improve his friendship with a number of his fellow practitioners, but, one would

imagine, this would not have worried James G. Beaney.

PROSTATIC OBSTRUCTION.3

By Julian Smith, Junior, Melbourne.

"When the hair becomes grey and scanty, when specks of earthy matter begin to be deposited in the tunics of the arteries, and when a white zone is formed at the margin of the cornea, at this same period the prostate gland usually,

I might perhaps say invariably, becomes increased in size."

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In the century which has passed since Brodie thus remarked on the frequency of enlargement of the prostate, the advance of surgery has done much to relieve the disorder, but we must admit that we remain almost as ignorant as Brodie concerning its causation. If we cast aside any thoughts of intimate pathology, we may regard prostatic obstruction as being due to one of three conditions: adenomatous hypertrophy, bar formation, and carcinoma.

1. Adenomatous Hypertrophy.

The use of the term adenomatous hypertrophy, obviously a contradictory one, arose from the belief, at one time widely accepted, that the enlargement of the prostate was neoplastic. There is no need to remind you of the work that has been carried out on this aspect of the disease or to discuss the exact site in the prostate where it is alleged that the pathological process begins. Suffice it to say that I believe that when a correct prostatectomy is performed, it is intracapsular, and that prostatic tissue is left lining the walls of the cavity from which the enlarged portion of the gland has been removed. It may perhaps be of more than academic interest to reflect upon the exact nature of the enlargement. If the man in the street were to be shown specimens of an enlarged prostate and a myomatous uterus, he would probably say: "Surely these are homologous diseases." Both the uterus and the prostate belong to the reproductive system. Both are liable, and naturally so, to periods of activity and quiescence. This old theory, as you know, led to the happily short-lived vogue of castration as a cure for the disease. Prostatic enlargement may also be compared with certain types of enlargement of the thyreoid. Here, however, attempts to explain the occurrence of nodules (the so-called adenomata) in the thyreoid have been rather more successful, and the exclusion of these nodules from the group of true tumours now appears to be quite justified. Paget, more than once, remarked on this subject. He say, for instance:

The relation of these new-formed isolated portions of thyroid or prostate gland is so intimate on the one side to admitted tumours, such as the chronic mammary, and on the other side to the general hypertrophies of the glands, that we cannot dissociate them without great violence to nature. Clearly they are all essentially the same kind of disease; yet to call them all tumours would be to do as such violence to the conventional use of terms, which have become not merely the expressions, but the guides of our thoughts.

It is certain that the time will come when quite confidently we shall be able to delete these prostatic enlargements from the list of neoplasms.

¹This paper was delivered on the occasion of the symposium on prostatic obstruction held during the eleventh annual meeting of the Royal Australasian College of Surgeons, Sydney, 1938.

From what quarter are we to expect an explanation of the disease? F. T. Paul, (1) in 1910, maintained that the evolution of the prostate was entirely controlled by the internal secretion of the testes, and that its enlargement was due not to a tumour, but to a process of involution. At the present time some observers believe that the prostatic enlargement is due to a diminution of the testicular hormone with advancing age. Others postulate the existence of a second hormone which they call inhibin—a product of the seminiferous tubules. They believe that this inhibin controls the gonadotropic activity of the pituitary gland, and that as age advances less inhibin is formed. The pituitary, thus released from its control, stimulates the interstitial cells of the testes, an excess of their hormone is produced and the prostate therefore enlarges.



FIGURE I.



FIGURE II.

In this connexion, the association of an enlarged prostate and diabetes insipidus in one patient is of interest, although, I should say, merely a coincidence.

This patient frequently measured his urinary output as ten pints a day. For years he had attributed the increasing dysuria to his pituitary disorder. At operation the prostate could be felt quite easily through the dome of the unopened bladder. The gland weighed thirteen ounces, and is the largest I have removed. It is interesting to note that since operation this patient's urinary output has been under four pints a day, and there has been no nocturnal micturition at all.

It surely must be one of the most whimsical of Nature's pranks to inflict

an obstructing prostate on a man with diabetes insipidus.

Increasing knowledge of the male hormones will no doubt provide us with help in early cases of prostatic enlargement. It is, however, unlikely that any advance in endocrinology will be so far-reaching as to afford an efficient manner in which prostatic obstruction may be treated when once established. As 30% of men over sixty years of age suffer from some degree of enlargement of the prostate, it should be the pious hope of many present that the biochemist in the near future will present us with an elixir to ward off this encumbrance of advancing years.

A typical section of an "adenomatous" prostate is shown in Figure I, while Figure II depicts a section of a gland in which the epithelial

proliferation is more active.

2. MEDIAN BAR.

The second type of prostatic obstruction embraces those cases described as the small fibrous prostate, prostatisme sans prostate and the median bar of Guthrie. They form a heterogeneous group, including many fibrotic, degenerative and inflammatory processes. The term "median bar" might perhaps be retained if it be understood that it is purely a clinical term used to designate an obstruction to the bladder neck which cannot be accounted for by lateral or middle lobe enlargement. These are the cases in which no enlargement of the gland can be felt per rectum, and in which there is little or no intravesical bulging to be seen on cystoscopy. Yet despite the small prostate, the degree of obstruction is often great and sometimes complete. Such cases are met not infrequently in practice, and their reputed

incidence has increased alarmingly with the revival of transurethral methods of dealing with prostatic obstruction. They have, furthermore, acquired a rather sinister reputation, largely on account of the unhappy results that are apt to follow attempts to deal with them by prostatic enucleation. Most authorities, I think, agree that the underlying cause of the obstruction is a chronic prostatitis or leading to fibrosis resultant contracture of the vesical neck. A typical example of the type of prostate under discussion is shown in Figure III, which is a section of one of many such prostates that have been removed (I will not say enucleated) at my hospital. There can be little doubt of the existence of an inflammatory reaction. In examining the

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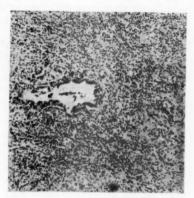


FIGURE III.

records of the prostatic cases over the past eleven years, there have been many such sections encountered, and invariably the operation notes record the absence of any marked enlargement and the great difficulty with which the gland was removed. A study of these cases furnishes grounds for agreeing with Wesson, (2) who stated his belief that a man whose prostate has been the seat of frequent venereal or unrecognized non-venereal infection was fairly well insured against a hypertrophy, but was practically guaranteed a median bar.

3. CARCINOMA.

This is without doubt the most distressing aspect of prostatic obstruction. Except in the hands of the most able urologists, the treatment of the cancerous prostate has been purely palliative. In examining the histories of some 800 cases of prostatic obstruction admitted to the Royal Melbourne Hospital, thirty-one were encountered in which carcinoma was strongly suspected by the surgeon (perhaps on account of the difficulty in dealing with a median bar by enucleation), in all of which, however, the pathologist failed to find any evidence of malignancy. On the other hand, my friend, Dr. Wright Smith, being kind enough to examine the records of the last 400 enucleated prostates which he had received from the operating theatres, found amongst them forty-six examples of carcinoma. This represents an incidence of carcinoma

in 11·2% of prostates removed. This fact is disturbing enough, but the recent statement of Rich⁽³⁾ becomes positively alarming. In a series of 292 consecutive autopsies on males over the age of fifty, dying from a wide variety of causes, he found frank carcinoma of the prostate on routine microscopical examination in forty-one—that is in 14%. In 66% of these the tumour was not recognized clinically. It would appear, therefore, that the incidence of carcinoma is much higher than those of us with limited experience would assess on clinical grounds alone, and that probably of the patients applying to us for the relief of prostatic obstruction, 15% to 20% will be found to have carcinoma. A typical example of carcinoma is shown in Figure IV.

DIAGNOSIS.

The diagnosis of enlarged prostate presents little difficulty if cystoscopy is practised as a routine. Among the Melbourne Hospital patients, however,

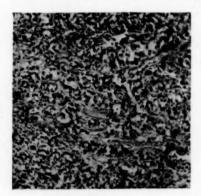


FIGURE IV.

there have been many instances where a small fibrous prostate has been mistaken for prostatic carcinoma. Unless the clinical signs are beyond dispute, I have always made a thorough bimanual examination of the prostate during the performance of suprapubic cystotomy, and have at times performed this operation purely to determine the diagnosis. A more precise estimation of the size, consistency and mobility of the gland can be obtained in this way than by cystoscopy or by rectal examination.

Apart from the diagnostic problem of carcinoma, cases which are grouped under the term "median bar" are liable to deceive the unwary. It is obvious that some of us at times have been too quickly impressed by the symptoms of vesical

irritability in an elderly man, and have reached the hasty conclusion that the symptoms of which he complains cannot be due to anything but an enlarged prostate. Furthermore, failure to demonstrate an enlarged prostate in such a case should not lead us to presume that we are dealing with a case of "median bar". The prostate in old age may cause frequency of micturition without obstruction, and in such cases no operation should be undertaken. It is important, therefore, that we should have a clear conception of these perplexing cases, for then many men may be spared the risk of prostatectomy or the unwarranted subjection to transurethral operations simply because they happen to micturate more than three times a day and once at night.

There are other occasions when the exact cause of urinary dysfunction is difficult to discover. In this respect I would like to refer briefly to one

case typical of five others that I have encountered.

A man, aged sixty-two years, complained of increasing difficulty in passing his urine over a period of five years. His bladder was distended. The prostate was not enlarged when felt per rectum. A large rubber catheter passed easily into the bladder, which was slowly decompressed. Later cystoscopy failed to show any enlargement of the prostate. The maximum urea concentration in the urine was 1.5%. Suprapuble cystotomy was performed. The prostate when palpated intravesically was not enlarged,

the vesical outlet was flat, and a No. 24 Charrière sound was passed into the bladder with ease. Thorough and repeated examination of the nervous system failed to reveal any signs of disease. The patient now, two years after his operation, passes about a quarter of his urine and then empties his bladder through the suprapuble catheter.

This history is fairly typical of that of the five other cases, except that in some the loss of power of expelling the urine has been absolute. All patients except one were about sixty years of age, the exception being a man whose trouble dated from an attack of retention due to acute gonococcal prostatitis, which was unrelieved for two days. In none of these patients could any neurological signs be detected. In all, exploration of the bladder was carried out, and in two, because of a suspicion of median bar, a segmental resection of the bladder neck was performed without the slightest improvement.

Atony of the bladder was referred to by Thomson-Walker⁽⁴⁾ in 1910, when he reported twelve cases, in none of which was the prostate enlarged nor was there any other urinary obstruction or any neurological signs of disease. Von Lackum and Mitchell⁽⁵⁾ quite recently have stated that they regard these cases as being examples of inflammatory bar which bulged more into the posterior urethra than into the bladder. The refusal of these authors to accept the evidence produced by such a master of instrumentation as Thomson-Walker is to my mind quite unwarranted.

There can be no doubt that primary atony of the bladder occurs. The exact cause is obscure. At the present time the only means at our disposal to help these patients is a permanent suprapubic drain. We may hope, however, that developments in the surgery of the sympathetic system will place in our hands a method of relieving those patients in whom the retention is only partial.

RENAL FUNCTION TESTS.

Omitting any consideration of the pathology of the obstruction, the decision regarding operation and the time at which it may be safely undertaken is largely determined by the degree of infection and renal efficiency. Great reliance has been placed on the blood urea estimation and urea concentration test. Although helpful in many cases, these two biochemical estimations are very inadequate as exact criteria of renal function, and in many cases are quite misleading. Patients admitted to hospital with complete retention often appear to satisfy surgical requirements when assessed on the results of these two tests. After the bladder has been decompressed there is frequently a sharp fall in the renal efficiency as measured by these urea values. Later, consequent upon a high fluid intake being forced on the patient, the values again are low, despite a real improvement in renal The occurrence of a urea concentration value of 3.5% and a blood urea of over 100 milligrammes in the same patient, should at least arouse suspicion as to the reliability of these tests. The urea clearance test would appear to be more exact, but I cannot help looking askance at any method which assesses physiological activity by resort to equations. final touchstone of renal efficiency is the indigo-carmine test, and a good blue excretion in a patient who, when subjected to forced fluid intake, is passing 100 ounces of urine a day, classifies him as a fit subject for prostatectomy in so far as his renal efficiency is concerned.

PRELIMINARY DRAINAGE.

In this respect the routine advocated by the late Harry Harris falls little short of the ideal. However, in hospital practice there has been frequent trouble with the indwelling catheter. House surgeons cannot be impressed with the necessity of treating the genitals and surrounding parts with as much aseptic care as a newly made wound. Moreover, the amount of nursing attention required to enforce this is lacking. Finally, the cooperation of the public hospital patient, as would be expected, is not so close as can be anticipated in private practice. For these reasons, when it appears that a lengthy period of pre-operative drainage will be necessary, I prefer suprapubic cystotomy. This is performed under local anæsthesia. An incision about an inch long is made, the rectus sheath is incised and the muscles are separated. The peritoneum is then stripped up with the point of the index finger and packed upwards with a small piece of gauze. The distended bladder is then stabbed with a trocar, and a No. 12 butterfly catheter is introduced through the cannula and anchored to the skin with a suture. This method of minimum interference leaves a smaller area open to infection, and the subsequent prostatectomy is not so difficult as when the tissues are more disturbed by a wider operation. I have always failed to see the necessity for the large suprapubic tube which is so often used.

The credit for suggesting the salutary effects which follow the division of the operation of prostatectomy into two stages has been given to Lilienthal and Pilcher. They were, however, preceded by one of Lister's house surgeons, Hector Cameron, of Glasgow. In 1890 he removed a stone from the bladder of an old man, who returned two years later with recurrent symptoms of vesical irritability. Cameron decided to wait a year and perform McGill's operation, which he did. He wrote:

The proper procedure in any case of prostatic growth with stinking urine is to do a cystotomy and examine the tumours to see if they are negotiable, and supposing an operation for their removal seems possible, then to wait and perform it subsequently. (9)

SURGICAL TREATMENT.

If carcinoma of the prostate be excluded, we have at our disposal three methods of removing the offending obstruction: perineal prostatectomy, transurethral resection and suprapubic prostatectomy.

(1) Perineal Prostatectomy.

I am forced to be very brief in my remarks concerning this operation, not through any disregard for the attributes it may possess, but because I have had no experience of it. The operation will always be indissolubly linked with the name of Hugh Young, of Johns Hopkins Hospital. He was one of the first to perform the suprapubic operation, forsook it for the perineal, and at an early stage in his career perceived that neither operation was suitable for certain types of prostatic obstruction, and conceived the idea of the punch. In addition, whilst taking great pride, as we should do, in the Harris operation, we should remember that it is due to one of Young's instruments that the technical difficulties of the operation have been very greatly diminished. His contributions to surgery have been legion, and it will be, I hope, many generations before his name ceases to grace the archives of urology. The perineal operation has not found a place

in British urology-largely on account of the early establishment of the suprapulic operation, and because of an exaggerated idea of the frequency of post-operative incontinence. It is interesting to note that Sir Thomas Fitzgerald performed what I believe to be the first prostatectomy at the Melbourne Hospital by this method in 1890.

(2) Resection.

In discussing this subject with you I admit that I am treading on insecure ground. I have been attempting to perform prostatic resection for the past six years. I can claim only a few successes and will frankly admit to a number of failures. To become efficient in the use of the resectoscope demands constant application, more than is possible in the work of a general surgeon. The resectoscope is no instrument to be employed by the occasional endoscopist.

The idea of surgical attack on the obstructing prostate via the urethra is not a new one. The method was devised by Guthrie and practised by

Bottini long before prostatectomy became established.

With the popular revival of transurethral resection some years ago, I think that all surgeons interested in urology hoped that the method might subserve three very useful functions: first, if it could be employed as a procedure less severe than prostatectomy, it would be the means of dealing with the bad risks; secondly, they hoped that it would be an effective means of overcoming the obstruction produced by the small prostate; and thirdly, that it might as a palliative measure give some respite to patients with prostatic carcinoma. I suspect that the sane urologist today restricts the use of the resectoscope to the treatment of these three types of prostatic obstruction. But in the interim what has happened? With the sale of the first resectoscopes in America there was a rush to be the first to publish a hundred cases. Shortly afterwards an ambitious person reported nine hundred cases of vesical neck resection done in three years. In Melbourne, with its population of a million, and having but three large general hospitals, there have been only nine hundred cases of prostatic obstruction admitted to the largest of the hospitals within the past twelve years.

Judging from the mass of reports of this operation, there is no doubt that it has been thoroughly abused. In certain quarters we are led to believe that this method is the answer to nearly all cases of prostatic obstruction. We are asked to accept the conclusion, to my mind doubly erroneous, that on the one hand suprapubic prostatectomy is a terrible operation with a high mortality, and on the other, that resection is a mild procedure capable of curing all patients no matter how debilitated. Numerous accidents occurring during resection have been reported, but if the unreported cases could see the light of day they might prove even more instructive. We have at present no effective surgical remedy for a great number of patients with prostatic obstruction in its late stages, and in patients who are bad risks I refuse to be convinced that a modified prostatectomy is

so much more hazardous than resection.

You all remember that in Sir Henry Thompson's day it was thought that the new operation of litholapaxy would replace cystotomy as the accepted method of removing a stone from the bladder. I would think that today most urologists are loath to disturb the deserved repose of the array of lithotrites in their surgical cabinets.

An amusing, if not pathetic, commentary upon prostatic resection has been made by John Cunningham, of Harvard. A few years ago he became somewhat identified with incontinence, as a result of having invented a so-called incontinence clamp for a patient upon whom he did a complete prostatectomy for carcinoma by the method of Young. A surgical warehouse which supplies most of the urologists of his country with their equipment, had been handling this incontinence clamp for years. An agent of the firm, when interviewed, stated that in 1930 twenty of the clamps were sold, whereas in 1933, following the resection "renaissance", the number increased to 365. Incidentally, it was later remarked that there was a corresponding falling off in the sales of drainage tubes, but that the sales of the clamp had "held up". The interpretation of this information from a leading firm is suggestive that incontinence has followed transurethral resection more often than the literature indicates. I cannot do better than terminate my remarks on this question by again quoting Cunningham's impressions gained from the thirty-third French Congress of Urology. They are that:

Resection is not all some claim for it; that prostatectomy should still be employed; that transurethral resection has a place in selected cases; that the procedure is highly technical; that complications occur not infrequently; that the results as regards cure in many instances show failure; that in some reports the mortality is greater than following prostatectomy; and that the procedure in selected cases is of value if properly carried out.

He continues:

The French, like the English urologists, are in accord with the most experienced urologists of the United States, and the opinion seems to be that transurethral resection has a place in the treatment of certain types of prostatic obstruction, but that its application to all forms is unwise. (7)

The wisdom of this attitude cannot be denied, and I for one refuse to accept the procedure as a substitute for prostatectomy until the results are presented, as Bransford Lewis so aptly remarks, "without the moonlight and roses".

(3) Suprapubic Prostatectomy.

There is no need for me to defend the inclusion of some historical facts connected with this operation, which began with the independent work of Belfield, of Chicago, and McGill, of Leeds. The disciples of these two surgeons in their respective countries were quick to seize on the possibilities of the operation, to perform it, improve it and record their experiences. In 1901 the harmony was disturbed by the strident voice of P. J. Freyer. He delivered a lecture before the Royal College of Surgeons of England, and shortly afterwards, on July 20, 1901, published in The British Medical Journal "A Clinical Lecture on Total Extirpation of the Prostate for Radical Cure of Enlargement of that Organ". Freyer's claim to priority was attacked in the medical press and the cudgels were taken up on McGill's behalf, particularly by Mayo Robson. The correspondence was no less vitriolic than that published in The Public Advertiser a hundred years before between Sir William Draper and Philo Junius. In reply to his critics, Freyer lodged a counter-attack and "protested against this practice which Mr. Mayo Robson has originated of performing suprapubic lithotomy, nipping off a small portion of the prostate, ignoring the effects of the removal of the stone, recording the case as a prostatectomy and attributing the results to this latter procedure alone". At about the same time Freyer received a just rebuke from Buckstone Brown for his reference in public to "that stinkpot of iniquity, the English bladder". It required the editorial voice of authority

to terminate the correspondence.

The controversial facts were quite recently balanced by the late Sir John Thomson-Walker in his Lettsomian lectures of 1930, and he was inclined to give the verdict to Freyer. (8) My own humble researches into the literature on the subject I believe furnish strong grounds for an appeal, for the accusation of surgical plagiarism against Freyer appears to me to be well founded.

In August, 1900, Dr. Ramon Guiteras, of New York, read a paper before the International Medical Congress in Paris on the treatment of prostatic hypertrophy. He was assisted in the preparation of the paper by Hugh Young, and in it the author explained his modifications of the operation of prostatectomy as practised by Eugene Fuller, his associate at the City Hospital, New York. The first publication by Fuller on prostatectomy appeared in 1895.⁽⁹⁾ His operation cannot justly be criticized, as it was by Freyer, on the grounds of incompleteness, like Belfield's and McGill's, who in their early cases contented themselves with removing part of the gland with scissors, for Fuller stated that:

The enucleation should not be desisted in until all the lateral and median lobe hypertrophies as well as all the hypertrophies along the line of the prostatic urethra have been removed.

He recorded six successful cases of prostatectomy, and it is interesting to note that some of them were operated on during the period of acute retention. He assisted his enucleation by means of pressure exerted by the fist in the perineum and afforded drainage through a perineal incision.

Guiteras modified the operation by inserting the finger in the rectum—a procedure on which was based one of Freyer's claims to originality. On his way to Paris to read the paper referred to, Guiteras called on Freyer and explained to him the method that Fuller and he had been employing for some years. Freyer was present at the congress in Paris and, in fact, read a paper on litholapaxy. This was in August, 1900. On December 1, 1900, Freyer performed his first suprapubic prostatectomy, and in July, 1901, published his "New Operation".

It is not without interest to recall the early operations performed in this country. In 1896 Gordon Craig reported a successful case of prostatectomy by McGill's method. In 1897, G. A. Syme performed a complete operation, while in the next year, Critchley Hinder, of the Royal Prince Alfred Hospital, reported four successes with McGill's operation.

If Freyer is to be censured we may perhaps enter a plea for extenuation as he once did himself, by recalling the words of Sydney Smith, who said:

That man is not the discoverer of any art who first says the thing; but he who says it so long, so loud and so clearly, that he compels mankind to hear him.

The crux of the operation of prostatectomy is the enucleation. Some glands shell out only with difficulty, others with ease. No one method of enucleation will render a truly difficult case easy. This is the one part of the operation that should never be hurried, for if, in order to gain a few minutes, a measured and deliberate enucleation gives way to hasty and disorderly tearing, then one may anticipate that the tranquillity of convalescence will be replaced by a period of turbulence. At the conclusion

of the enucleation, the paths followed by different surgeons become widely divergent when the question of hæmostasis is considered. There are those who would follow Freyer, attracted no doubt by his excellent figures and low mortality, in no single instance of which does hæmorrhage figure as a cause, nor is mentioned more than casually as an accompaniment of the operation. Surgeons at my hospital during the past ten years have not been so fortunate as Freyer, for amongst the deaths after prostatectomy there have been no less than twelve from primary hæmorrhage, in eight of which no hæmostatic measure was employed (Table I). I think we must all agree that this question deserves our closest attention, not only in the operating theatre, but now.

Table I.

In 559 cases of Prostatectomy there were 12 deaths from Primary Hæmorrhage.

		Metho	d of H	læmost	asis.		Number of Deaths.
Suture							 1
Suture	and pac	ek.			0.0	0.0	 1
Pack				0.0	0.0	0 0	 2
NII	0.0			9.0		0.0	 8
							 12

There are three devices used for the purpose of hæmostasis: first, some form of suturing; secondly, packing the prostatic cavity with gauze; and, thirdly (in this company mentioned voce pianissimo), the Pilcher bag.

The control of hæmorrhage by suture is probably the ideal method, and there is no need for me to recall to your minds the part played by the late Harry Harris in founding the reputation which the operation now most deservedly enjoys. The sutural technique of the Harris operation has been adopted in the practice of the Melbourne Hospital, but with a few exceptions my colleagues have been loath to close the bladder. The figures (Table II)

TABLE II.

Harris Operation in 84 Cases.

					Number of Cases.	
Hæmorrhage uncontrolled	hy anture				11	
Closure of bladder					91	
Primary healing					8	
(4 of these required secondary bladder	operative	treat	ment	for		

show that in eighty-four cases in which this operation was performed, the hæmorrhage was uncontrolled by suture in eleven. In thirty-one cases where the bladder was closed, primary healing occurred but in eight, and, of these, four suffered from post-operative bladder-neck obstruction requiring operation for its relief. There have been many instances of severe shock following a prolonged operation, due to obstinacy on the part of the surgeon in persisting with suturing in the attempt to achieve hæmostasis. It is highly commendable

to uphold ideals of surgical technique, but to attempt to apply them constantly and without exception is stupid. The execution of the Harris operation is usually not difficult, but in some patients who are fat and in others who have had a preliminary cystostomy, it may prove to be exacting both to the patient and to the surgeon.

My remarks on this theme are without any ambition to distrust or any intention to dispraise the work of Harry Harris or the operation which he planned and performed with such distinction. As Harris said: "It is not an operation for the occasional prostatectomist." My strictures, though slight, are not directed at the operation, but at the men who attempt to perform it in all cases without due consideration of their ability to do so. I have many times successfully performed the Harris operation. On other occasions attempts at suture have been quickly abandoned because of a quiet word of warning from the anæsthetist. In other patients, when planning the operation, I have cast aside any thoughts of employing sutural hæmostasis. I believe that the general surgeon who indiscriminately performs the Harris operation will have a higher mortality after prostatectomy than he should.

Packing the cavity from which the prostate has been removed is still often either employed as a hæmostatic method of election or resorted to when the bleeding is uncontrolled by suture, and although in some quarters the reputation of this method may be held in esteem, to my mind it is distinctly shady. There is no doubt that packing the prostatic cavity will control hæmorrhage, but when the bleeding is brisk, firm pressure is necessary. The gauze becomes adherent, and when it is removed bleeding is inevitable. My analysis of the cases at the Melbourne Hospital regrettably discloses six instances where the removal of this packing has resulted in the death of the patient from hæmorrhage. There have been other instances in which serious hæmorrhage has been recorded, and almost invariably bleeding has occurred in some degree. I have always considered this a most abominable method of securing hæmostasis, and I hope that some of you will share my view.

If we are agreed that some form of hæmostatic agent is desirable, but that suture may not always be indicated, and that packing is unsound, we are forced to adopt the Pilcher bag. This simple contrivance has been used, and still is quite sporadically, but, for my part, in cases where suture does not appear to be appropriate, it fulfils all requirements most admirably. Criticism is usually directed against this ingenious device of Paul Monroe Pilcher on the grounds that it causes great pain and that incontinence often follows its use. I imagine, too, that the æsthetic sense of some surgeons is offended by its rather bizarre appearance. In any departure from surgical tradition to novelty, how often is prejudice the forerunner of failure!

That the bag possesses three merits not enjoyed by the other two methods we have been considering cannot be denied. In the first place, it will control hæmorrhage; secondly, its application is more rapid and easy than the use of sutures; and, thirdly, its removal does not cause further

hæmorrhage.

May I briefly suggest how the bag should be used. At the conclusion of the enucleation a well-curved metal catheter is passed along the urethra, and its tip made to present at the suprapubic wound. The tip of the catheter is then fitted into the end of the traction tube and the catheter withdrawn until the bag lies in the bladder. The bag is now distended with water to a moderate degree, and by traction on the tube emerging from the urethra

is drawn down onto the rim of the prostatic cavity. The tube through which distension has been effected is now tied. The other tube is given to the instrument nurse to hold, or is tied onto the patient's big toe. When the bag has been correctly introduced, it will be found that the greater part of it lies in the bladder. The genitals and emerging tube are enclosed in a sterile dressing. The operation is concluded and the traction maintained until the patient returns to bed, when the traction tube is made fast to the end of the bed by a piece of stout silk. An injection of morphine is given after operation, at a time depending upon the anæsthetic which has been used. Five or six hours after operation the tension on the bag is removed and the bag deflated. Instructions are issued that should further hæmorrhage occur, the bag is to be distended to an equivalent degree and the tension reapplied. The removal of the bag in forty-eight hours is easy and causes only momentary pain.

The pain which this bag is alleged to cause, and which in my experience is no greater than that which often follows the insertion of sutures into the region of the vesical sphincters, is due either to prolonging the traction unnecessarily, or to pulling the bag into the membranous urethra. These errors, too, may be responsible for the occurrence of the incontinence which is declared to follow its use. I believe, however, that incontinence of urine after prostatectomy, in which the hæmostatic agent has not been abused,

is due to one cause only, and that is a faulty enucleation.

Briefly to conclude this aspect of the subject, may I compare the apparent efficiency of the various hæmostatic methods which have been employed. The figures would appear to show at least that some effort should be made to secure hæmostasis, and also that packing is to be condemned (Table III).

TABLE III.

Deaths from Hæmorrhage (26).

							Dea	aths.
		Meth	od of	Hæmo	stasis.		Primary.	Secondary
						 4.6	 8	4
Suture (124)			• •	• •		 * *	 8	4 0
Suture (124) Suture and	pack						8 1 1	4 0 0
Suture (124)	*:			0 0	0.0	 4.0	 8 1 1 2	4 0 0 3+61

¹ Deaths from hæmorrhage on removing packing.

If I were to be restricted to the use of one method of dealing not only with operative bleeding, but with cases of severe secondary hæmorrhage, I would unhesitatingly choose the Pilcher bag.

The after-treatment of cases of prostatectomy when the bladder has been drained is mainly directed at keeping the urine sweet and the patient dry. The former will be attained by bladder irrigations judiciously carried out far better than by the most liberal administration of urinary antiseptics. The latter is most comfortably achieved by a simple suction apparatus, such as is represented in Figure V. The vertical arm, which terminates in a nozzle similar to that on a Sprengel's pump, is adjustable to any length and controlled by a screw. The circular plate through which this passes, lies flat

The figures in parentheses denote the number of cases in which the respective hæmostatic measures were employed.

on the patient's abdominal wall, and the length of the vertical arm is so adjusted that the nozzle lies not in the bladder, but just within the unsutured part of the suprapubic wound. The apparatus is held in place by a firm

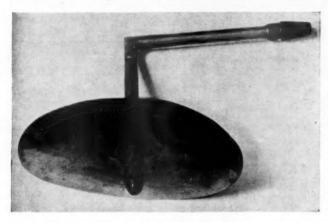


FIGURE V.

binder, which is pinned around the bent part of the metal tube. This method seems to me to be preferable to the Hamilton Irving cup, which is uncomfortable, difficult to keep in place and thus often leaks, and which by its pressure always causes eversion of the edges of the wound.

COMPLICATIONS.

I do not intend to make more than passing reference to some of the complications of prostatectomy.

I imagine that all of you who have performed this operation have occasionally been called to see the patient a few hours later because he is "flat". His pulse is poor, though perhaps not rapid, his blood pressure is low, and he appears to be shocked. When we consider the age of these patients and the small physiological margin which they frequently possess, it is not so extraordinary that despite a well-conducted operation such a condition is apt to occur. I do not refer to patients frankly suffering from loss of blood, in whom a transfusion is clearly indicated, but rather to the patient who appears to be shocked while the surgeon is rathered bewildered that he is so.

There is no doubt that in such circumstances intravenous saline is of the greatest value. Not only in this immediate post-operative period, but later, there are unquestionable indications for its use. It is my practice to give it on the slightest provocation. The patient is lethargic, his tongue is dry and the urine scanty. Saline is given. The next day his condition is the same. More saline is given. In two, or perhaps three, days there is a dramatic change. He becomes interested, his appetite returns, his tongue is moist and the urinary output increases. The question of fluid intake, both before and after operation, is of paramount importance, and a high level is

best sustained in the latter instance by assuring its entry into the body by intravenous injection.

There can be no doubt that of all the complications of prostatectomy, secondary hæmorrhage is the most disturbing (Table IV). Often it is not

TABLE IV. Secondary Hæmorrhage.

		Meth	od of	Hæmo	tasis.			Number of Cases.	Deaths.
11 (223)								0	4
		0.0	0 0			 0.0		1	
uture (124		001	0.0	0 0		 0.0		1	0
uture and	pack (33)	4 4	9.9	0.0	 0.0		1	0
ack (128)	0.0	* *	= 4			 4.4		7	3
lag (54)						 		3	1
					-	 			
							i		
								21	8

From the histories it would appear that only cases of severe secondary hæmorrhage have been recorded.

severe, and is but a passing incident. The mild cases can be adequately dealt with by irrigation with hot silver nitrate solution, on which the hæmorrhage soon ceases. In others the bleeding is more severe and prolonged, and the lost blood must be replaced. Sometimes more direct measures must be taken and pressure applied to the bleeding point. Again the Pilcher bag is ideal. A well-curved metal catheter is passed along the urethra and up through the suprapubic wound and the bag drawn into place. In all cases of any grade of severity the surgeon who closes the bladder after prostatectomy has placed himself at a disadvantage. The danger of secondary hæmorrhage is not so much its liability to cause death through exsanguination as its tendency to precipitate the patient into renal failure, or to prepare the ground for fatal pyelonephritis.

As a more remote complication, the suprapubic wound may fail to close. Roughly speaking, this may be due either to a secondary bladder-neck obstruction, or to the bladder becoming unduly adherent to the abdominal wall. As a generalization it may be said that in the former case the patient cannot pass his urine, while in the latter case he can. It is not without interest to note that more than a third of the cases of secondary bladder-neck obstruction occurring in the series under review had some form of suturing of the prostatic bed after enucleation of the gland (Table V). Those patients

TABLE V.
Post-operative Obstruction.

		Meth	od of	Hæmo	stasis.			į	Number of Cases.	Percentage.
Nil (223) Suture (124) Pack (128) Suture and Bag (54)) paek	(33)	• •			• •			10 10 4 3	4·5 8·0 3·0 10·0
arious	• •	• •	• •		• •		• •		4	0
									31	

in whom the suprapubic wound continues to drain despite normal micturition can be relieved by dissecting the bladder free from the integument under local anæsthesia. In any case, a patient who one month after prostatectomy is either not passing his urine or is still draining through the suprapubic wound, should be viewed as requiring further operative treatment.

RESULTS.

In conclusion, may I present to you the experience of the surgical staff at the Royal Melbourne Hospital over the past eleven years (Table VI).

Table VI.

Results in the Series of 810 Patients Treated.

Discharged with permanent cystostom	1.	 	60 72 354
Died after prostatectomy		 	104
Various		 	17 J 456
survived prostatectomy		 	450

Excluding those suffering from carcinoma, there were 810 patients treated. It is indeed a dismal fact that only 456 of these patients were in any measure relieved of their incapacity. As you see, many of them died shortly after being admitted to hospital, a smaller though equally striking mortality followed suprapubic cystostomy, while many were discharged with tubes in their bladders to mingle with the flotsam and jetsam of the out-patient departments. Expressed in terms of percentages, the figures become even more depressing (Table VII). Roughly speaking, a little more than half

TABLE VII.

Results in each 100 Patients with Prostatic Obstruction.

Died without any more than catheterization		 12
Died after suprapubic cystostomy	* *	 7
Discharged with permanent cystostomy		 9
Died after prostatectomy		 13
Survived prostatectomy		 56
Received advice and nothing more		 2

of the patients who apply for treatment of their prostatic obstruction are relieved, without in any way taking into consideration the temporary, and in many cases prolonged, morbidity that follows the removal of the prostate.

The condition in which patients come to hospital, or rather are admitted to hospital (and there is a great difference in these two phrases), is very often deplorable. Of the 810 patients, 523 were admitted with complete retention, and in 33 others the residual urine was over ten ounces, while in 139 patients in whom the degree of retention was not stated in the records, it may, judging from subsequent events, be assumed that it was high (Table VIII). These facts, coupled with the high mortality after prostatectomy, are in my opinion capable of an explanation which is purely domestic, and which I do not propose to discuss.

TABLE VIII.

Degree of Retention.

Number of patients		 * *			810
Complete retention		 		 523	
Over 10 ounces		 		 33	
Varying amounts	0.0	 0.9		 115	
Not stated		 0.0	**	 139	810

The aged hospital patient appears to regard urinary trouble as an inevitable affliction of his advancing years, and until he learns to think otherwise his surgeons will be handicapped from the start. In hospital practice, therefore, we must always anticipate dealing with a number of patients in whom the morbidity and proportion of bad risks are high.

If we consider the mortality after prostatectomy, the most striking fact is that there are many unnecessary deaths (Table IX). Among the 104

Table IX.

Causes of 104 Deaths in 559 Cases of Prostatectomy.

			Terrorean opened during operation in both cases.
Peritonitis		2	Peritoneum opened during operation in both cases.
Pulmonary embolism		3	
Cardiae		5	
Gangrenous cystitis		3	
Bladder-neck obstruction		2	1 difficult enucleation of fibrous prostate; 1 Harris operation with closure.
Hæmorrhage ,.	••	24	12 primary, 4 of which were large retroperitoneal hæmorrhages. 6 secondary. 6 on removing packing.
Uræmia		17	Sutures failed to control hamorrhage in 2. Secondary hamorrhage in 1. Poor renal function tests noted in 3.
Shock		5	1 after spinal ansesthetic; 1 very difficult enucleation; 1 after prolonged operation where hemorrhage was uncontrolled by suture.
Anuria		3	Hæmorrhage and shock in 1; poor renal function tests in 1.
Pneumonia	• •	14	Hæmorrhage and shock in 2 cases. 1 case operated on 4 days after admission with acute retention.
Pyelonephritis		19	In 2 much hæmorrhage at operation. In 1 secondary hæmorrhage.

fatal cases there were twenty-eight in which surgical accidents were directly and absolutely responsible, and in twenty other cases accidents or errors of surgical judgement were undeniably contributing factors. The percentage mortality over the past eleven years has, however, steadily declined. Last year there were four deaths in forty-five prostatectomies. In one of these fatal cases the patient succumbed suddenly to a pulmonary embolus after he had regained his powers of micturition, while another was operated on in spite of a poor renal function, simply because he had been drained suprapubically for three months.

Excluding these cases, which I refer to as accidents (for under the circumstances it is a kind word), we envisage a possible mortality of 5%. In the type of patient met with in public hospital practice, I doubt if this figure can be greatly improved. How shall we avoid exceeding this mortality? I am not competent, neither would I be so arrogant, as to suggest to my seniors how this desirable result should be achieved. But I venture to remind those who in their surgical swaddling clothes may have designs on patients with prostatic obstruction, that:

Not to go back is somewhat to advance, For men must learn to walk before they dance.

The figures presented in this paper, although they include those of the urologist to the hospital, should be taken as representing the experience of the general surgical staff. Happily, the mortality in the past ten years has shown a steady decline, and, although last year's figure of 10% cannot be viewed with complacency, it is, I believe, somewhat of an achievement that the mortality has been lowered to such a figure under the circumstances revealed in Table VIII.

The steady improvement in the results of prostatectomy I believe is due in large measure to the teaching of the late Harry Harris. He insisted on the most careful pre-operative treatment and complete hæmostasis at operation. These are cardinal points, and we should admit to no exception in their observance.

Great strides have been made in the past decade in the treatment of prostatic obstruction. I suppose that in all matters surgical our touchstone of progress is mortality rate and prospect of cure. The mortality following prostatectomy can be, and has been, reduced to a very acceptable figure, and the results of the operation are satisfactory. Resection carries with it a mortality lower than most of the reported series of prostatectomies. But what prospect of permanent cure does it offer? We are told that if at first the procedure is inadequate, it may be repeated, and repeated yet again and again. I cannot believe that the most ardent resectionist would deny that each subsequent operation carries with it an increasing liability to infection and its attendant dangers. The mortality of the procedure will, of course, then increase, and may approach that of prostatectomy.

We may yet witness the treatment of early prostatic enlargement by the physician if he learns to correct our glandular imbalance as we grow old. Until that time, however, I firmly believe that the general surgeon, in our community at least, will be continually asked to deal with the problem of prostatic obstruction.

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THE TREATMENT OF URÆMIC INTOXICATION COMPLICATING PYLORIC STENOSIS WITH VOMITING.

WITH A REPORT ON TWO CASES SUCCESSFULLY TREATED BY JEJUNOSTOMY.

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INTRODUCTION.

Since 1923, when Brown, Eusterman, Hartman and Rowntree⁽¹⁾ reported eleven clinical cases of "duodenal toxemia" in cases of pyloric and duodenal obstruction, interest has been widely shown in the syndrome that develops in pyloric stenosis when vomiting becomes marked and persistent. There ensues a condition of intoxication (the "duodenal toxemia" of Brown and his associates), which simulates uræmia. This is characterized clinically by nervous irritability, headache, flushed face, dehydration and albuminuria, and in extreme cases by incoherence, semiconsciousness and manifestations of tetany. In these cases blood examination reveals an increase in the urea and non-protein nitrogen content, a lowering of the plasma chloride, an increase in the carbon dioxide combining power of the plasma and a high concentration of the red cells. McVicar⁽²⁾ has shown that the severity of the toxemia can be estimated by the degree of biochemical alteration and its progress measured by repeated blood estimations, while Cooke⁽³⁾ has found that in susceptible subjects the symptoms and biochemical alterations are aggravated by the ingestion of alkaline powders.

In recent years a large body of experimental evidence concerning the ætiology and treatment of this condition has accumulated. Haden and Orr⁽⁴⁾ have shown in dogs that experimental obstruction of the duodenum leads to death in three or four days, but that if saline be administered subcutaneously the animal will live for three weeks or more. White and Fender⁽⁵⁾ have succeeded in keeping a dog with duodenal obstruction alive and in good condition for a month by injecting the vomitus through a jejunostomy tube into the bowel below the obstruction, while Armour and his co-workers⁽⁶⁾ in a similar experiment have kept a dog alive for over six weeks by feeding

it with Locke's solution, glucose, peptone or bile, and "Marmite". Both these two latter teams of workers concluded that the intoxication that accompanied duodenal obstruction was due to the loss in the vomitus of salt and water from the body. As the inorganic electrolytes were not replaced, it became impossible for the animal to retain its normal water balance, and so fatal changes were set up in the physico-chemical equilibrium of the blood and tissues.

PURPOSE OF THIS PAPER.

It is now well recognized that if the intoxication resulting from persistent vomiting in cases of pyloric stenosis, either cicatricial or spasmodic, is not first corrected, surgical intervention may result in a fatal issue if the ordinary procedure of gastro-enterostomy be carried out. Little, however, is known of the problems that arise in the pre-operative care of these patients. The usual routine treatment by frequent feedings of liquid food, cessation of alkalis and daily gastric lavage, is not sufficient to correct this intoxication in every case; in many patients the administration of saline, either rectally or parenterally, is also required. Occasionally refractory cases of persistent vomiting are met with, and in these feeding by jejunostomy is indicated. We think it of value to present a series of cases of pyloric stenosis with vomiting, illustrating the effects of treatment by various pre-operative methods, and to discuss from our experience how the problems of pre-operative treatment in this condition should be approached.

CASE REPORTS.

The first six cases illustrate the results of various methods of pre-operative therapy; the remaining two show the effect of jejunal feeding with saline and glucose.

A résumé of the history and clinical features of each patient is given and, except in cases of the first two, a chart is appended summarizing the biochemical findings in graphic form. The graphs are all constructed to a uniform pattern. The abscissæ show divisions into periods of time, while the ordinates show three columns, expressing (1) the blood plasma chloride values (as sodium chloride) in milligrammes per hundred cubic centimetres of blood, (2) the blood urea values in milligrammes per hundred cubic centimetres of blood, and (3) the carbon dioxide combining power of the plasma in volumes per centum. After each column the range of normal value is indicated by The same symbols are used to express the various curves short upright lines. throughout, viz.: a series of small transverse lines, the blood chloride curves; a series of upright lines, the blood urea curves; and a series of small circles, the carbon dioxide combining power values. Above the graphs are particulars of the temperature, pulse rate and blood pressure; below are the hæmatocrit indices expressing the percentage ratio of cell volume to total blood volume, and particulars of the urine volume for twenty-four-hour periods, the urine chloride, and the urine urea content. The sodium chloride intake comprises the total daily amount in grammes given by all routes, including the intravenous, intraperitoneal, subcutaneous and rectal, while, in addition, the amounts and strengths of all saline solutions given intravenously are marked across the graphs.

The various blood estimations were all made on oxalated samples of blood by standard methods:

The plasma chloride (as sodium chloride) by Van Slyke and Sendroy's method.
 The plasma carbon dioxide combining power by Van Slyke's method.

The blood urea on whole blood by Maclean's urease method.
 The hæmatocrit index by means of capillary hæmatocrit tubes.

The urine estimations were made on twenty-four hour specimens of urine as follows:

1. The urinary chloride by the same method as the plasma chloride.

2. The urinary urea concentration by the hypobromite method.

The following six cases illustrate the effects of various forms of non-operative therapy.

Case I .- Pyloric Stenosis with Vomiting. Death from Uramic Intoxication.

The patient, J.P., male, aged twenty-two years, a student, was admitted to the Aberdeen Royal Infirmary about noon on September 19, 1930, after having had two "fits" earlier in the morning. The history was obtained from his parents. For over a year he had complained of periodic attacks of epigastric pain coming on two hours after meals. Radiological examination earlier in the year had disclosed signs of duodenal ulceration, without evidence of pyloric obstruction. He was treated by diet and powders, with complete relief of symptoms. While on a visit to Belgium a few weeks before his admission to hospital, his symptoms had returned, and in the last two or three weeks he had been vomiting copious quantities of fluid and had been losing strength rapidly. Fearing that he might fail in his examinations if he lost time by being sent to bed, he neglected to seek medical advice. On the morning of admission, before rising he had a fit lasting about ten minutes. During this he moaned as if in pain and pointed to his abdomen, then his arms stiffened, and a tremor came over his body. He did not appear to lose consciousness. As this attack was succeeded within an hour by a second "fit", he was immediately transported to hospital.

On admission he appeared wasted, and was drowsy and very irritable. Passage of a stomach tube disclosed retention of two to three pints of dark brown fluid. Typical tetanic spasms of the hands and feet occurred soon after admission, and were relieved by the intravenous administration of ten cubic centimetres of 5% calcium chloride solution. Rectal infusions of normal saline solution with 5% glucose were commenced on the first day. On the second day, and thereafter daily, saline solutions were given intravenously in addition to the rectal salines. For the first three days 600 cubic centimetres of 5% sodium chloride solution were given daily; subsequently normal saline solution was used. Blood examination on September 21, 1930, showed the following levels: blood urea 185 milligrammes, plasma chloride 365 milligrammes per 100 cubic centimetres of blood, and plasma carbon dioxide combining power 125 volumes per centum. The serum calcium estimation on September 24, 1930, revealed a level of 9·1 milligrammes per 100 cubic centimetres of blood. In spite of treatment, the blood urea rose steadily, reaching its highest recorded level of 240 milligrammes on September 25, 1930. The urine throughout was alkaline in reaction, varied in specific gravity from 1013 to 1020, and contained albumin, red blood cells and casts.

In spite of treatment, clinical improvement did not occur, and surgical opinion was against any operative interference at this stage. Vomiting of brown-stained fluid, which gave a positive benzidine reaction, continued, though the stool gave a positive reaction only after September 24, 1930. Frequent, almost daily, lavage of the stomach was carried out with sodium bicarbonate solution. Ammonium chloride (fifteen grains thrice daily) was given by mouth. By September 24, 1930, the patient became maniacal, suffered from delusions and had to be restrained. Soon afterwards he became comatose and his pulse became weaker. Death ensued on September 26, 1930.

A post mortem examination was made by Professor T. Shennan, who found that the pylorus and first part of the duodenum were thickened, fibrosed and indistensible. The lumen of the pyloric orifice was 0.8 centimetre in diameter, while an irregular fibrosed ulcer about two centimetres across was present in the duodenum. The stomach was grossly distended, its wall was thin, and its mucosal surface showed several superficial erosions. The remainder of the alimentary tract showed no abnormality. The macroscopic appearance of the kidneys appeared to be normal, except for the presence of some cortical congestion. Fairly extensive hæmorrhagic hypostatic pneumonia was found in the lungs, without pleurisy or pleural effusion.

This case was one of extreme cicatricial pyloric stenosis secondary to chronic duodenal ulceration. As a result of profuse and persistent vomiting, uramic intoxication (alkalosis) supervened, and this, in spite of treatment along accepted lines, finally led to his death.

Case II .- Pyloric Stenosis with Vomiting. Death.

The patient, R.G., male, aged forty-eight years, was a farmer, who, when admitted to the Aberdeen Royal Infirmary on September 8, 1933, gave the following history. Eighteen years earlier appendicectomy had been performed for "chronic appendicitis".

Since then he had complained of periodic attacks of lower abdominal pain coming on two hours after meals, and relieved by taking food or alkalis, or by vomiting. One month before admission to hospital he had had nine teeth extracted on account of pyorrhœa, and since then he had been "off his food". In the past five days his pain had become more severe and vomiting had become copious and frequent, the vomitus

containing food taken up to twenty-four hours previously.

On admission he appeared fairly well nourished. His tongue was dry and furred, and marked splashing was elicited in the epigastrium. The blood urea level was 3 milligrammes per 100 cubic centimetres. Vomiting continued following admission, the vomitus consisting of brown fluid, with a strongly positive benzidine reaction, while hiccup occurred from time to time. The stomach was washed out daily with boric lotion. On September 12, 1933, a barium meal examination disclosed almost complete pyloric spasm, the patient vomiting most of the meal. Blood examination on September 15, 1933, showed that the blood urea had risen to 190 milligrammes, while the plasma chloride level was 438 milligrammes per 100 cubic centimetres. Four-hourly rectal salines were then ordered, and 450 cubic centimetres of 5% sodium chloride solution were given intravenously, followed by 600 cubic centimetres of normal saline solution on the succeeding day. On September 18, 1933, blood estimations showed that the blood urea value was 76 milligrammes and the plasma chloride 525 milligrammes per 100 cubic centimetres.

Laparotomy was then performed under ether anæsthesia. The pylorus and the first part of the duodenum were found to be thickened and indurated, while the stomach was markedly dilated and congested. Posterior gastro-enterostomy was carried out. Before the abdomen was closed, 1,000 cubic centimetres of normal saline solution were left behind in the peritoneal cavity, and after operation rectal and subcutaneous salines were given. The patient, however, did not rally. Cyanosis developed and death occurred within twenty-four hours. A blood examination just before death revealed a blood urea of 132 milligrammes and a whole blood chloride value of 438 milligrammes per 100 cubic centimetres (normal level 450 milligrammes). A post mortem examination was not made.

This case was probably one of uremic intoxication complicating pyloric stenosis with vomiting. Treatment by salines and gastric lavage was followed by some response as shown by improvement in the biochemical alterations of the blood, but operation was undertaken before full recovery occurred.

Case III .- Pyloric Stenosis with Vomiting. Recovery. (Table 1.)

The patient, E.M., female, aged sixty years, was a thin, poorly nourished woman, who had complained of anorexia, increasing muscular weakness and loss of weight for over twelve months. In the past six months she had developed epigastric fullness and discomfort after meals, these symptoms being relieved by occasional attacks of vomiting.

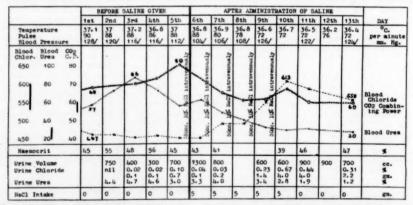


Table I. Summary of findings in Case III. Case of pyloric stenosis due to chronic duodenal ulceration, with changes in the blood chemistry consequent on prolonged vomiting. Relief of these changes followed the administration of hypertonic saline solutions.

Radiological examination showed gross gastric atony with twenty-four-hour retention, and some time subsequently this was shown at operation to be due to pyloric stenosis consequent on chronic duodenal ulceration. In the week preceding her admission to hospital she had vomited daily 600 to 1,200 cubic centimetres of clear watery fluid containing pieces of undigested food.

On admission she appeared thin and wasted, her tongue was dry, and her eyes were sunken. The urine was acid in reaction, had a specific gravity of 1030, and contained acetone; albumin and casts were absent. She was given two-hourly feedings, mainly of milk and water, and at times of Benger's food, "Ovaltine" and custard. Daily gastric lavage was instituted, her resting gastric content varying from 60 to 350

cubic centimetres, with a chloride content of between 0.5% and 0.6%.

For five days the plasma chlorides remained low at from 452 to 467 milligrammes per 100 cubic centimetres, while the blood urea level was raised to from 57 to 86 milligrammes per 100 cubic centimetres; the plasma carbon dioxide combining power was also raised, and varied from 68 to 80 volumes per centum. Simultaneously the urea excretion was high, while the urinary chloride output was almost negligible. On the fifth day, and thereafter daily for four subsequent days, 50 cubic centimetres of 10% sodium chloride solution were given intravenously. After a latent period of twenty-four hours the plasma chloride rose steadily, and simultaneously the blood urea and carbon dioxide combining power values dropped to normal, and the hæmatocrit indices fell. After the fifth injection, chloride appeared in the urine in large amount, while the urea excretion decreased. Coincident with these alterations in the blood chemistry, marked clinical improvement was noted, the patient becoming brighter and more lively, and her thirst disappearing. Gastric lavage was then discontinued. This improvement was maintained, for nine days later the blood chemistry was still normal (blood urea 33 milligrammes per 100 cubic centimetres, plasma chloride 558 milligrammes per 100 cubic centimetres, and carbon dioxide combining power 65 volumes per centum).

This case was one of uræmic intoxication treated by diet and gastric lavage, and responding rapidly to the intravenous administration of hypertonic saline solution. Subsequently gastro-enterostomy was carried out, and convalescence was short and uneventful.

Case IV .- Pyloric Stenosis with Vomiting. Recovery. (Table II.)

The patient, A.M., male, aged forty years, was a thin but well-built man, who five years previously had been operated on for perforated duodenal ulcer, simple closure being performed. Since then he had kept to a convalescent diet, avoiding

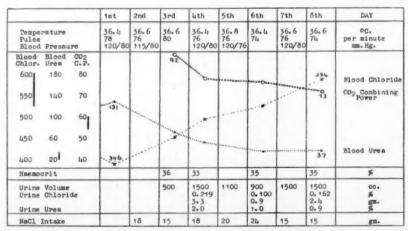


Table II. Summary of findings in Case IV. Case of pyloric stenosis due to chronic duodenal ulceration, with intoxication following prolonged voomting, treated by diet, gastric lavage and rectal salines.

meat and taking regular doses of alkaline powder (two to three drachms per diem), and had remained free of gastric symptoms until three months before admission to hospital. During this period, however, he had had frequent attacks of renal colic, which were terminated by pyelolithotomy a year before his present admission. In the last three months he had developed marked vomiting, at first bringing up 1,200 to 1,300 cubic centimetres of greenish fluid twice a week, and later 1,200 to 3,600 cubic Although he had experienced but little abdominal pain, he was centimetres a day.

losing weight rapidly.

On admission he appeared wasted and rather drowsy, his tongue was dry, and the facial appearances suggested dehydration. Marked epigastric splashing was elicited. The urine was alkaline, had a specific gravity of 1012, and contained acetone, a trace of albumin and a few hyaline and granular casts. The blood urea was 131 milligrammes per 100 cubic centimetres and the plasma chloride 396 milligrammes. He was given frequent feeds of orange drinks, glucose drinks and milk and water; later Benger's food, "Ovaltine", milk and cream, soup and custards were added. Alkaline powders were withheld. Rectal salines were given daily in quantities varying from 1,500 to 2,400 cubic centimetres of 1% sodium chloride solution with 4% glucose. Daily gastric lavage revealed resting gastric contents of from 300 to 1,200 cubic centimetres, with chloride concentrations up to 0.8%. Under this treatment rapid improvement occurred in his clinical condition, albuminuria and ketonuria disappearing on the third day. The resting gastric content, however, tended to increase, probably as a consequence of an increased fluid diet.

This case is an example of a steady and rapid response to simple methods of treatment in a patient with uramic intoxication following pyloric stenosis with vomiting. A few days later at laparotomy the diagnosis of cicatricial pyloric stenosis from duodenal ulceration was verified. Gastro-enterostomy was carried out, and was

followed by a short and uneventful convalescence.

Case V .- Alkalosis Complicating Pyloric Stenosis with Vomiting. Improvement. Death later from Post-Operative Pulmonary Embolism. (Table III.)

The patient, A.R., male, aged forty-two years, was a thin but wiry man, who had been troubled with indigestion for many years, and had been found to have radiological signs of duodenal ulceration two years previously. Since then he had been taking alkaline powders, in amounts averaging over 226.5 grammes (half a pound) of baking soda a week. Two months before admission to hospital he began to vomit at frequent intervals each day, and after a week became delirious. He then slowly recovered, and for three weeks was up and about. Subsequently, ten days before admission, vomiting recurred, and he vomited daily more than 2,500 cubic centimetres of sour watery fluid. The more he vomited, the more powder he took.

On admission he appeared drowsy and mentally confused. A provisional diagnosis

of alkalosis complicating pyloric stenosis was made. This was confirmed by blood

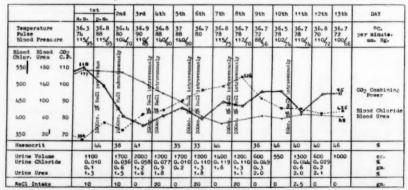


Table III. Summary of findings in Case V. Alkalosis following administration of large doses of alkaline powder in a case of pyloric stenosis with vomiting. Relief of symptoms with treatment by diet, withdrawal of alkalis, and hypertonic saline intravenously.

examination, the following values being found: plasma chloride 336 milligrammes per 100 cubic centimetres, blood urea 177 milligrammes per 100 cubic centimetres, plasma carbon dioxide combining power 110 volumes per centum. Chvostek's sign was present, but manifest tetany was absent. The urine was alkaline in reaction, and contained acetone and albumin, while the urinary urea was low and the urinary chloride negligible. Microscopical examination of the urinary deposit demonstrated numerous epithelial cells and red blood cells, but casts were not seen.

Saline administrations were started at once, at first by the rectal route, then subcutaneously and finally intravenously. The latter had to be discontinued when the blood in the majority of the arm veins had clotted. Alkaline powders were stopped, and the patient was placed on a fluid diet, semi-solids being added later. The fluid intake and fluid output were recorded and a positive fluid balance was maintained. By the fourth day albumin disappeared from the urine. Vomiting, however, continued, the patient bringing up an average of 500 to 1,000 cubic centimetres daily. Gastric lavage was carried out daily after the fourth day, the resting stomach contents averaging from 300 to 900 cubic centimetres, with a chloride concentration varying from 0·11% to 0·58%. A fractional test meal showed a high free hydrochloric acid value of 0·25% in the gastric juice an hour and a half after the commencement of the test.

Under this régime the patient steadily improved, his drowsiness disappearing and his condition becoming brighter. Complete recovery, however, was hindered by the persistence of vomiting. His chart shows that under the influence of saline administrations the plasma chloride rose steadily to a maximum level of 526 milligrammes on the eighth day, thereafter falling again when the administrations ceased; the plasma carbon dioxide combining power fell to 76 volumes per centum on the third day, and subsequently showed a tendency to rise, while the blood urea fell to 60 milligrammes on the seventh day, at which level it remained stationary. The urinary constituents were also affected. Albumin disappeared on the fourth day, and the urea concentration in the twenty-four-hour specimens increased from 1.3% to 2.1%, while on the sixth, seventh and eighth days, when the plasma chloride values were raised, the urinary chloride tended to increase.

At a later date it was shown at operation that there was a very marked degree of pyloric stenosis secondary to chronic duodenal ulceration, while the stomach was increased in size and had hypertrophied walls. Gastro-enterostomy was performed. Death from pulmonary embolism occurred six days later. At autopsy the kidneys showed macroscopic and microscopic evidence of a nephritis of mixed glomerular and interstitlal types (Professor J. M. Beattie). This finding is of importance when correlated with the comparatively poor excretion of urea in the urine recorded throughout the period of observation.

This case is an illustration of uræmic intoxication occurring in duodenal obstruction, in which the alkalosis was aggravated by the ingestion of large quantities of alkaline powder in the presence of some degree of chronic nephritis.

Case VI.—Carcinomatous Stenosis of the Pylorus with Vomiting. Improvement. Post-Operative Death. (Table IV.)

The patient, E.S., male, aged forty years, was a wasted, prematurely aged man, who for three and a half months had complained of attacks of griping pain in the epigastrium, coming on ten to twenty minutes after meals, and lasting about half an hour. No relief had been obtained with alkalis. One week before admission to hospital he commenced vomiting at frequent intervals (at least once every six hours) and usually after each time he ate or drank. On admission his tongue was dry and cracked, his mouth was parched and his eyes were sunken. He was immediately placed on a fluid diet, consisting mainly of milk and water. Daily (often twice daily) gastric lavage was instituted, the resting gastric contents averaging 300 to 500 cubic centimetres, with a chloride content up to 0.38%. In spite of this treatment, vomiting of watery fluid recurred once or twice daily. A fractional test meal revealed in the fasting juice (volume 300 cubic centimetres) a titratable acidity of 0.036%, while the later specimens were without free acid. Subsequently radiological examination demonstrated a large prepyloric carcinoma, with complete occlusion of the gastric lumen, leading to complete six-hour retention of the barium meal.

The biochemical findings were observed over a period of three days, during which the plasma chloride level remained low (the values being 351, 380 and 336 milligrammes per 100 cubic centimetres), the plasma carbon dioxide combining power

remained stationary at from 70 to 73 volumes per centum, and the blood urea, though high, fell from 116 to 70 milligrammes per 100 cubic centimetres. At the end of this period the patient was given 2,500 cubic centimetres of 2% sodium chloride and 6% gum acacia solution by intravenous drip, the whole quantity being administered within twenty-four hours. Immediately after the administration had ceased, examination of the blood revealed that the plasma chloride level had been raised from 336 to 484 milligrammes per 100 cubic centimetres, while the blood urea had fallen still further, and the plasma carbon dioxide combining power had shown a tendency towards rectification. Twenty-four hours later all three biochemical levels had reached normality, but thereafter the plasma chloride values again showed a tendency to fall and the carbon dioxide combining power to rise. The hæmatocrit index fell from 49 to 33 following the administration of saline. This fall was

			BEFO	ORE SAL	INE	AP	TER SAL	INE ADM	INISTRA	HOIT	
			1st	2nd	3rd	4th	5th	6th	7th	8th	DAY
Pulse	rature Pressu	re	36.6 74 100/76	36.8 70 100/70	36.7 74 96/74	36.6 74 100/74	36.3 68 94/74	36.6 60 94/70	36.6 64 96/74	36.4 74 94/70	oc. per minute mm. Hg.
Chlor- 550	Blood Urea 100	CO ₂ C. P. 80	ii6	1	travenously		530				
500	80	70	70		13	B. # 1.84					
450	60	60	-		10 1 N	Tally .			-		Blood Chlorid CO2 Combining
400	40	50					*******		2.05 W 2 D 7 B 2 B 4 5 B 2		Power
350	50	40	351		250020					34	Blood Urea
Haema	tocrit		48	64	49	33	40	43	45	lsl:	%
	Volume Chlori	de	850 0.010 0.1 3.5	600 0.017 0.1 3.4	1000 nil 3-4	1400 0.073 1.0 2.7	750 0.090 0.7	600 0.060 0.4 4.2	400 0.035 0.1 4.1	400 3.8	cc. % gm.
NaCl 1	Intake		0	0	0	50	0	0	c	0	gm.

Table IV. Summary of findings in Case VI. Case of uræmic intoxication consequent on prolonged vomiting in a patient with a prepyloric carcinoma of the stomach.

accompanied by a drop in the red cell count from 5-5 million to 3-1 million. Subsequently the hæmatocrit index rose again, though it never reached its previous maximum. The urine specimens were acid in reaction throughout and were always free from acetone bodies. The urinary chloride was always low, while the urea concentration was high.

On account of the neoplastic nature of the pyloric obstruction and of the persistence of vomiting, the marked improvement in the biochemical findings seen in this patient was not accompanied by a corresponding degree of clinical improvement. Subsequent laparotomy disclosed a large carcinoma of the pyloric antrum of the stomach, with numerous metastatic deposits in the gastro-hepatic omentum and great omentum and a few nodules in the liver. Posterior gastro-jejunostomy was carried out. Following operation the patient appeared languid and drowsy. Vomiting did not occur, nor did aspiration of the stomach disclose any undue gastric distension. Treatment by subcutaneous saline administrations was unavailing, death occurring on the fifth day. As a post mortem examination was not made, the cause of death was not ascertained.

The following two cases illustrate the effects of jejunal feeding with saline and glucose solutions.

Case VII.—Pyloric Stenosis with Vomiting. Saline Administered by Jejunostomy. Recovery. (Table V.)

The patient, J.M., male, aged sixty-six years, was a pale, wasted man, who for thirty years had suffered from periodic attacks of epigastric pain coming on

two to three hours after meals and relieved by food or alkalis. Five months previous to admission to hospital his symptoms became more troublesome. For a time he was treated by fluid diet, daily gastric lavage and belladonna, with great benefit. Subsequently he kept to a convalescent diet and took three drachms of alkaline powder daily. One month before admission, after he had taken liberties with his diet, the pain returned once more, and he began to complain of nausea and loss of weight. For the last four days he had vomited daily two to three pints of clear watery fluid. In addition to his gastric symptoms, he gave a history of attacks of frequency of micturition with dysuria, which had disappeared after a left lumbar nephrectomy in 1933.

He was admitted to the Aberdeen Royal Infirmary on February 21, 1937, when he appeared slightly drowsy and showed evidence of severe dehydration in the form of a dry furred tongue, drawn face and sunken eyes. Vomiting was occurring at fourto six-hourly intervals, and marked epigastric splashing was present. The urine was acid, contained acetone, but not albumin, and on centrifugalization showed an occasional pus cell and granular cast. Blood examination disclosed a blood urea value of 127 milligrammes and a plasma chloride value of 512 milligrammes per 100 cubic centimetres. He was given frequent fluid feeds, and his stomach was washed out

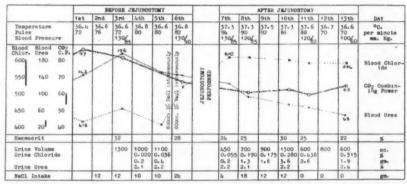


Table V. Summary of findings in Case VII. Case of pyloric stenosis due to chronic duodenal ulceration with severe intoxication consequent on prolonged vomiting. Marked improvement following administration of saline by jejunostomy.

daily with saline, about 200 cubic centimetres of normal saline solution being left behind each time. Salines were not given by any other route. Under this treatment he steadily improved, and on March 4, 1937, the blood urea and plasma chloride levels were normal. Although a barium meal examination on March 9, 1937, was spoilt by the patient vomiting about three-quarters of the meal, the six-hour observation disclosed a considerable degree of pyloric stenosis. Unfortunately, following this radiological examination, severe vomiting recurred in amounts up to 1,000 to 1,500 cubic centimetres daily of dark brown fluid. Intermittent rectal salines were given (the patient retaining from 1,000 to 1,800 cubic centimetres of 1% sodium chloride solution daily), and for two days no fluids were given by mouth. Following this. frequent feedings of glucose drinks, orange juice and milk and water were given in amounts up to 1,200 cubic centimetres daily. Gastric lavage was carried out in the same manner as before, but the vomiting continued and steady physical deterioration set in. Detailed blood investigations were commenced on March 22, 1937 (first day on chart). On March 26, 1937 (fifth day on chart), the patient appeared drowsy and very dehydrated, and additional salines were given intravenously.

It now appeared that death was imminent if further treatment on similar lines was persisted with. On March 27, 1937, therefore, jejunostomy was performed under "Novocain" infiltration anæsthesia supplemented by very light ether anæsthesia while the peritoneal cavity was opened. A vertical incision 7.5 centimetres (three inches) long was made through the left rectus muscle at the level of the umbilicus, and a number 10 E catheter was inserted 7.5 centimetres (three inches) into the jejunum

at a point about 20 centimetres (eight inches) below the duodeno-jejunal flexure. The catheter was then embedded for two centimetres (three-quarters of an inch), after the manner employed in a Witzel gastrostomy, the suture material employed being fine thread. Before closure of the abdominal incision, the jejunum was fixed to the parietal peritoneum by sutures, also of fine thread.

Following the patient's return to the ward, jejunal feeding was commenced. At first 70 to 100 cubic centimetres of 1% sodium chloride and 5% glucose solution were given every two hours; next day the amounts were increased to 250 cubic centimetres every three hours from 6 a.m. to 12 midnight, but on the following day they had to be reduced to from 150 to 200 cubic centimetres because the flow through the tube and funnel ceased when larger quantities were given. Salines were not given by any other route. From the second day (eighth day on the chart) fluids varying in amount from 700 to 1,400 cubic centimetres daily were given by mouth, at first consisting of orange drinks, fruit juice and glucose drinks, while later milk, cream, "Ovaltine" and soups were added. As vomiting had now ceased, gastric lavage was stopped. The rapidity with which improvement occurred was very striking. Within two days the patient's drowsiness had disappeared, his thirst was quenched, and his features had filled out. He developed, however, a slight cough with some scanty mucopurulent expectoration, but this disappeared rapidly after April 1, 1937 (eleventh day on the chart), when glucose solutions were substituted for saline in the jejunal feedings. Though a very close watch was maintained throughout, ædema of the extremities or back was not noticed.

The chart of this patient shows clearly the biochemical changes that took place in the blood both before and after jejunostomy. For the first five days the plasma chloride values were low (from 418 to 454 milligrammes per 100 cubic centimetres), though following administration of intravenous saline they rose to 530 milligrammes, this rise continuing after jejunostomy and reaching its maximum level of 610 milligrammes twenty-four hours later. High blood urea values were observed before jejunostomy, a maximum peak of 196 milligrammes per 100 cubic centimetres being recorded on the third day, followed by a fall to 144 milligrammes on the sixth. This fall continued after jejunostomy, the blood urea reaching 48 milligrammes on the thirteenth day. High plasma carbon dioxide combining power values were recorded during the first six days before a normal level was reached on the eighth day. Marked falls were noticed in the hæmatocrit indices and were accompanied by a decrease in the red cell count of from 3.8 million on the third day to 2.6 million on the thirteenth.

The subsequent history of this patient is instructive because, before recovery was reached, unforeseen complications occurred which were the result of defects in the operative technique, and which were eliminated in Case VIII. The lessons learnt will be referred to in the discussion and concern the situation of the abdominal incision, the point in the jejunum selected for insertion of the tube, and the distance

the catheter should be embedded in the bowel wall.

On April 4, 1937, the jejunostomy tube came out into the dressing, and the wound started discharging slightly acid gastro-intestinal juice. As the skin was rapidly becoming exceriated, continuous suction was applied to the jejunal fistula, and an amount of 1,900 cubic centimetres of green serous fluid was obtained in twenty-four hours. Continuous intravenous saline infusion (1,200 to 1,800 cubic centimetres of 1% sodium chloride in 5% glucose solution daily) was commenced. In view of the serious consequences of such a large fluid and salt loss, an attempt to check the flow was made by packing the fistula with gauze and strapping the abdomen. Leakage continued in spite of the packing and digestion of the abdominal wall resulted, so that the fistulous opening increased in size until it would accommodate a tube 2.5 centimetres (one inch) in diameter. On April 8, 1937, a blood transfusion of 600 cubic centimetres was given on account of anæmia, the blood count before transfusion being 2.6 million cells per cubic millimetre. Throughout this period the plasma chloride values remained normal (varying from 540 to 584 milligrammes per 100 public centimetres), but the blood urea rose from 41 milligrammes on April 5, 1937, to 61 milligrammes on April 8, 1937.

Although signs of deterioration were now present, the patient's general condition was still fairly good. It was realized that if the loss from the fistula did not cease soon, any chance of saving the patient's life would be lost. On April 9, 1937, therefore, under gas and oxygen and ether anæsthesia, the abdomen was reopened, the incision chosen being a right upper paramedian one. The diagnosis of cicatricial pyloric stenosis was confirmed by finding the pylorus fibrosed and contracted and the stomach

dilated and thickened. Access to the left half of the abdomen and thus to the upper jejunal coil was hindered by adhesions around the jejunostomy. Posterior gastroenterostomy was carried out, the most dependent portion of the stomach being anastomosed to the jejunal coil immediately below the jejunostomy by an anastomosis of isoperistaltic type. The jejunal stoma appeared to be about 50 centimetres (twenty inches) below the duodeno-jejunal flexure. Because the afferent and efferent loops were unduly long and liable to kinking, an anastomosis was made between them, the opening in the afferent loop being of necessity distal to the fistula.

The patient stood this intervention very well. As the majority of arm veins had clotted following prolonged intravenous saline injections, subcutaneous salines were given. On the second day after operation two-hourly feeds of 150 cubic centimetres of fluid were given by mouth. Marked diminution was noticed in the flow from the fistula, which was now strongly alkaline and was more readily controlled by packing. Slow progress, however, was made until after April 14, 1937, when the fistulous opening in the jejunum appeared plainly visible at the bottom of the jejunostomy wound and was readily closed under local anæsthesia. Apart from some delay in the healing of the abdominal wounds, the result of infection, the subsequent after-history

was one of straightforward progress.

We may summarize the principal features of this case by stating that it was one of uremic intoxication complicating pyloric stenosis, and that very marked improvement followed the administration of saline and glucose solution by jejunostomy, after earlier treatment by rectal infusions had proved ineffectual. Whether similar and equally rapid improvement would have followed the more intensive use of parenteral saline solution will be considered in the discussion. Certain lessons regarding operative technique were learnt because of some unforeseen complications that followed jejunostomy, and these lessons will be referred to later. They were successfully applied in the next case.

Case VIII.—Pyloric Stenosis with Vomiting. Saline and Glucose Administered by Jejunostomy. Recovery. (Table VI.)

The patient, G.F., male, aged forty years, was a thin, rather pale, but well-built man, who in 1928, after having suffered from attacks of epigastric pain for more than two years, had undergone the operation of Judd's pyloroplasty and appendicectomy. Subsequently he remained free of symptoms for six months before he again developed attacks of epigastric pain of typical duodenal ulcer type. Such attacks were periodic, lasted two to three weeks, and were followed by periods of remission of symptoms of two to four months' duration. In the last three years, however, frequent attacks of vomiting had developed. He underwent a course of medical treatment without benefit, and subsequently only occasionally took doses of alkali, as he had found that these powders had now lost their former potency. Ten days before admission to hospital (after a period of freedom from symptoms lasting two months) he had an attack of

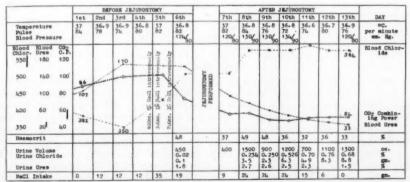


Table VI. Summary of findings in Case VIII. Case of pyloric stenosis due to chronic duodenal ulceration with severe intoxication consequent on prolonged vomiting. Marked improvement followed administration of saline by jejunostomy.

severe diarrhœa which lasted a week. At the conclusion of this attack he became constipated and started vomiting 2,600 to 5,200 cubic centimetres (four to eight pints) of yellowish or clear watery fluid each day. On one occasion he filled a washing pail a third full of fluid.

On examination he appeared thin and very dehydrated. His intellect was bright and no sign of latent tetany was observed. Marked epigastric splashing was elicited. The blood urea was 107 milligrammes per 100 cubic centimetres, the plasma chloride 382 milligrammes, and the plasma carbon dioxide combining power 86 volumes per centum. He was given small fluid feeds by mouth every two hours, and the stomach was washed out with saline at frequent intervals. Vomiting, however, occurred from time to time. Intermittent rectal salines were given daily, and intravenous salines were given on the fourth and fifth days.

As clinical progress seemed slow and uncertain, jejunostomy was performed on the sixth day under light ether anæsthesia, a vertical incision being made through the right rectus muscle at the level of the umbilicus, the technique followed being that described in the discussion. [At a later date it was found that the jejunostomy opening was 100 centimetres (three feet) below the duodeno-jejunal flexure.] Jejunal feeding was begun eight hours after operation, commencing with 150 cubic centimetres of 1% sodium chloride in 5% glucose solution at two-hourly intervals, which quantity was progressively increased till the patient was taking 300 cubic centimetres every three hours. Milk, orange drink and water were given by mouth. Vomiting did not occur, and very striking improvement was manifested after forty-eight hours. On the tenth day a slight cough developed and a few crepitations were heard at the bases of the lungs. Following this signal the salt intake was restricted and glucose solutions only were given through the jejunostomy tube. Œdema of either the trunk or the extremities was not noted, though examination was made daily.

The chart of this patient shows a marked improvement in the blood chemistry following jejunal feeding. For the first six days the blood urea remained at a high level and was not affected by treatment. Following jejunostomy, it immediately showed a very rapid fall and reached a normal value within six days. The plasma chloride, which was low for the first three days, commenced under the influence of intravenous salines a rapid rise, which was completed by the jejunal salines, when a "high normal" value was reached on the eighth day and chloride appeared in the urine in adequate amount. The plasma carbon dioxide combining power, which at first was raised, was also affected by the intravenous saline therapy and was restored to a normal level on the seventh day.

The later progress of this patient was free from the distressing complications that occurred in Case VII. The jejunal catheter came out spontaneously a fortnight later, the track it had occupied closing without leakage. By this time the patient was in excellent general condition. Under gas and oxygen and ether anæsthesia the abdomen was opened by a left upper paramedian incision, and the diagnosis of cicatricial pyloric stenosis confirmed. Posterior gastro-enterostomy was carried out. Following operation, his recovery was uneventful, and he was discharged fourteen days later with his wounds soundly healed.

This case resembles Case VII, in that marked clinical and biochemical improvement followed the administration of saline and glucose solutions by jejunostomy, after earlier treatment by rectal and intravenous salines had proved uncertain.

DISCUSSION.

This series of eight patients furnishes examples of the more serious forms of the uræmic intoxication that supervenes in cases of pyloric stenosis when vomiting becomes frequent and persistent. The first two patients died, one (Case I) because, owing to the persistence of vomiting, the ordinary methods of treatment were inadequate in combating the intoxication; the other (Case II) because a major operation was undertaken before the condition had been relieved. The remaining six cases illustrate the difficulties that arise in treating this complication in order that the major surgical procedure of gastro-enterostomy may be undertaken with reasonable safety, and they demonstrate that the ordinary routine measures of frequent feedings with liquid food, cessation of alkalis and aspiration of the stomach, are not

always sufficient to correct the intoxication, but that additional methods may have to be employed in some cases.

The appearance of uræmic intoxication in cases of pyloric stenosis with vomiting is not uncommon. The condition is referred to in current literature as "duodenal toxæmia" or as "alkalosis", or but we believe that the term "uræmic intoxication" is preferable to these, in that it reflects more truly the clinical characteristics of the condition. As an entity it is associated not only with pyloric stenosis, but is seen in prolonged hyperemesis from other causes, and in acute gastric and duodenal fistulæ. In all these conditions there is excessive loss of water and salt, and as this loss is not replaced, it becomes impossible for the body to maintain its normal fluid balance. As a result fatal changes are set up in the physico-chemical equilibrium of the blood and tissues which lead to uræmic manifestations.

The clinical picture shown by cases of this condition strongly resembles that of uræmia as seen in cases of primary renal insufficiency. In mild cases the patient complains of thirst, headache, abdominal distension and irritability, and on examination presents a flushed face with anxious expression, a dry tongue and a dry skin. Laxity of the skin from wasting is usually present, and marked epigastric splashing can be demonstrated on palpation, while the passage of a stomach tube reveals evidence of gastric retention. The systolic blood pressure is seldom above 140 millimetres of mercury. In severe cases the patient becomes drowsy, incoherent and rambling in his speech. Twitching of the facial muscles and fingers and other manifestations of tetany may occur, while the Chvostek and Trousseau signs may be elicited. The smell of acetone may be detected in the breath.

The urine is usually scanty in amount, and may be of either high or low specific gravity. It is usually alkaline in reaction and contains albumin and acetone, although occasionally, even in the absence of ketonuria, it may be acid. Red blood cells and epithelial and granular casts may be found in the deposit. The urea concentration may be low and the urinary chloride almost absent. These changes are not invariable, but when present they are evidence of renal impairment, and are due to a toxic nephritis either sui generis or supervening on a pre-existing renal lesion. With the improvement that results following the establishment of an adequate urinary output, the albuminuria tends to disappear and the renal function improves, as shown by the tendency of the urinary urea concentration to rise, despite the fall that occurs in the urea level of the blood.

On blood examination marked alterations are found in the blood urea and in the plasma carbon dioxide combining power values, which are raised, and in the plasma chloride value, which is lowered. These alterations differentiate the condition from the uramia of primary nephritis, in view of the fact that in true renal uramia the plasma carbon dioxide combining power is usually lowered, while the plasma chloride tends to be normal or raised. McVicar⁽²⁾ has shown that the degree of alteration in the blood constituents is a measure of the severity of the "toxamia", and that the progress of a case may be estimated by a study of these blood changes.

The differential diagnosis between true renal uræmia and the more severe manifestations of uræmic intoxication in pyloric stenosis may be a matter of great difficulty from the clinical aspect, particularly if no adequate history is available. In these cases chemical examination of the blood is essential, and

this may provide the only certain criteria for distinguishing the two conditions. Sometimes combinations of the two states occur and add to the difficulties of diagnosis. The chief differences by which they may be distinguished are summarized in Table VII.

_	Pyloric Stenosis.	Chronic Nephritis.
1. History	History of previous indigestion. Patient usually young or middle-aged adult. Vomiting marked and associated with gastric retention. Blood pressure seldom over 140 mm. Hg. Respiration quiet and shallow. Ko characteristic change in fundus.	History of previous renal disease Patient usually middle-aged or elderly. Vomiting usually at first of morning type. Blood pressure may be high. Respiration may be exaggerated. Fundus shows exudates and hemorrhages. No characteristic feature on examination
tion. 8. Urinalysis	8. Urine: Alkaline, variable specific gravity, albumin, red blood cells and casts.	of abdomen. 8. Urine: Acid, low specific gravity, albumin, red blood cells and casts.
9. Blood chemistry	9. Blood urea under 200 mg, per 100 c.c. Plasma chloride under 450 mg, per 100 c.c. Plasma CO ₂ combining power over 80 vol. per cent.	 Blood urea over 200 mg. per 100 c.c. Plasma chloride over 550 mg. per 100 c.c. Plasma CO₂ combining power under 50 volumes per cent.

TABLE VII. Differences between uraemic intoxication in pyloric stenosis and uraemia in chronic nephritis.

Not every case of pyloric stenosis with persistent vomiting develops clinical or biochemical signs of uræmic intoxication. Recently we have had three patients who all presented normal blood chemistry even though they were admitted to hospital because of copious and persistent vomiting, and though laparotomy subsequently disclosed well-marked degrees of pyloric stenosis from chronic duodenal ulceration. In these patients no abnormal constituents were found in the urine, whereas in our cases of uræmic intoxication, with one exception (Case III), we found albumin and frequently red blood cells and casts. This suggests that the chief difference between the two groups is the presence of renal impairment which is the result of toxic nephritis following prolonged dehydration.

It is important that in all cases of pyloric stenosis the condition of uræmic intoxication should be recognized when it is present either in mild or in severe degree—in mild degree because if left untreated it adds an unnecessary risk to any major surgical interference, and in severe degree because in the past it has often been confused with the primary renal uræmia of chronic nephritis and death has resulted because proper treatment was not undertaken. In every case of pyloric stenosis the blood should be examined before a major operation is undertaken. We believe that, of various blood changes, alteration in the blood urea level (10) is the most significant and furnishes the most reliable criterion of the severity of the intoxication. If the blood urea is found to be raised, the operation of gastro-enterostomy should be postponed until the azotæmia has been corrected.

We shall now outline the methods by which such correction may be brought about. The outstanding features in these cases that require treatment are dehydration, starvation of the body tissues, gastric retention, azotæmia, hypochloræmia, alkalosis and, in extreme cases, tetany.

ROUTINE METHODS OF TREATMENT.

The measures that may be employed will be considered seriatim for the sake of completeness.

1. Feeding.—Small feeds should be given every two hours, beginning at 6 a.m. and ending at 8 or 10 p.m., each feed consisting of 150 to 200 cubic centimetres of concentrated liquid or semi-solid carbohydrate food. Glucose and orange drinks, milk and water, malted milk, cream, "Ovaltine", cocoa made with milk, ice cream, boiled custard, Benger's food, arrowroot and strained cream soups are some of the foods that may be used. Orange juice, halibut liver oil or other suitable vitamin preparations should be added. Broths, meat extracts and plain milk should be avoided—the first two because they stimulate gastric secretion, and plain milk because it curdles and interferes with the emptying of the stomach by aspiration. Such a diet as outlined above is nutritious and does not irritate the stomach either mechanically or chemically.

2. Cessation of Alkalis.—Alkaline powders should be withheld, as their ingestion tends to aggravate the alkalosis usually present.

3. Administration of Fluids.—The average daily intake of fluid in the diet recommended is about 1,500 cubic centimetres. In addition, rectal infusions should be employed as a routine measure, about 1,500 cubic centimetres of 0.5% to 1% saline in 5% glucose solution being given daily. In cases of severe intoxication this should be reinforced by the subcutaneous or intravenous administration of saline solution, both normal saline and 5% glucose solutions being used. We believe that to correct hypochloræmia it is preferable to use normal and not hypertonic saline, because an equivalent amount of sodium chloride given in dilute solution has a greater effect on the plasma chloride level than when it is given in concentrated form. (10) A chart should be kept on which are recorded the total fluid intake and the total fluid output for each day.

It is necessary to ensure that an adequate amount of fluid be given daily to correct dehydration. A patient lying in bed requires daily from 1,000 to 1,500 cubic centimetres of fluid for adequate urine excretion and an equivalent amount for the insensible loss in the sweat and in the stool. In addition, any loss in the vomit or in the aspirated stomach contents has to be allowed for. Therefore, in the absence of vomiting, at least 2,500 cubic centimetres of fluid are required daily to maintain a proper fluid balance. In the case of a dehydrated patient additional fluid is needed to correct the water deficit, which has been shown to approximate to 6% of the body weight. (11) In the case of a man weighing 60 kilograms this equals 3,600 cubic centimetres.

The amount of saline solution given should contain from 15 to 20 grammes of sodium chloride, which can be given in 1,500 to 2,000 cubic centimetres of 1% solution. Any additional fluid required may be given as glucose solution or as plain water. This intake of salt contrasts with the basal metabolic requirements of two grammes (12) and the usual intake in an ordinary diet of six to twelve grammes per diem. If the administration of large quantities of salt be continued over several days, ædema of the lungs and of the extremities may develop. It has been pointed out by Orr (13) that, as a result of starvation consequent on excessive vomiting, there is a reduction in the total serum protein of the blood, chiefly in the serum albumin fraction.

There is thus a diminution in the osmotic pressure exerted by the blood colloids, and this diminution accounts for the tendency to ædema which arises when the tissue content of salt is raised to high levels. In administering saline it is therefore necessary to estimate the plasma chloride at least every second day, and when the plasma chloride approaches normal the salt intake should be restricted.

4. Aspiration of the Stomach.—Aspiration of the stomach should be carried out daily (or in severe cases of gastric retention more often and preferably before meals) with either a Ryle's tube or a Senoran's evacuator, as long as the resting gastric content is over 200 to 300 cubic centimetres. This measure relieves distension in cases of gastric retention, and permits the gastric muscle to contract and regain its normal tonus.

It is not sufficiently realized that gastric lavage, by withdrawing salt and water from the body, tends to aggravate the concomitant toxemia. Many clinicians in addition to carrying out aspiration wash out the stomach with sodium bicarbonate solution, thereby neutralizing the hydrochloric acid secreted in the stomach and so further aggravating the alkalosis. Sodium bicarbonate solutions, therefore, should never be employed, but for irrigating the stomach plain water or preferably dilute saline solution should be used. A small quantity of saline may with advantage be left behind in the stomach.

- 5. Administration of Belladonna.—In many cases of spasmodic stenosis marked relief follows the exhibition of belladonna or its alkaloid, atropine. A useful method of administration is to give fifteen minims of the tincture of belladonna three times daily.
- 6. Treatment of Tetany.—The presence of manifest tetany requires for its relief the immediate administration of calcium. A convenient method is the intravenous injection of calcium chloride or calcium gluconate (five cubic centimetres of 10% solution), with or without sedatives. This should be followed at once by intensive administration of saline and glucose solutions.

TREATMENT BY JEJUNAL FEEDING.

The Place of Jejunostomy in the Treatment of "Duodenal Toxamia".

Though it seems to us that the use of jejunal feeding is the logical outcome of the experiments on duodenal obstruction performed by White and Fender⁽⁵⁾ and by Armour and his associates, ⁽⁶⁾ we are able to find reference to only one case of "duodenal toxæmia" ⁽¹⁴⁾ in which this method has been tried, although jejunostomy has been extensively employed with success in the treatment of ulceration of the stomach and duodenum where resection has been technically impossible owing to extensive and widespread fibrosis and adhesions. ⁽¹⁵⁾ It seemed to us that the failures and partial successes sometimes experienced in treating severe cases of uramic intoxication complicating pyloric stenosis by the routine methods of treatment, were due to continuance of the vomiting because of an almost complete high intestinal obstruction. As a result of this prolonged vomiting such patients died from starvation, dehydration and chloride loss.

It is well known that in conditions of shock and dehydration fluid given orally or rectally, if it is absorbed from the alimentary tract, is more efficacious than when given by parenteral routes. However, if vomiting should persist, the absorption of fluid from the rectum is not sufficient to allow this route to be used alone, although it may prove sufficient in less severe cases

(e.g., Case IV). The administration of saline solutions by the subcutaneous and intravenous routes is governed by a time factor, few patients being able to tolerate continuous saline administration longer than three or four days, while the use of the intravenous drip frequently leads to clotting in the veins and cessation of the flow. It therefore occurred to us that jejunal feeding should be tried as it afforded a better physiological method of administering saline solution than the subcutaneous and intravenous routes, and enabled the administration to be continued for longer periods than by the parenteral methods. Moreover, by means of jejunostomy specially prepared foodstuffs might be given to ameliorate the starvation.

Cases VII and VIII show how patients with uræmic intoxication due to persistent vomiting from pyloric stenosis respond to feeding by jejunostomy. In both these cases the ordinary routine methods (dietary, gastric lavage, rectal salines), which had produced good results in other cases, were tried over a period of six days, but without apparent clinical benefit. In both patients the commencement of jejunal feedings was followed by a rapid and almost immediate improvement in both the clinical condition of the patient and the blood chemistry. It is probable that, had the intravenous administration of salines been continued, better responses to the routine methods might have been seen, but we believed that it was not justifiable to persist with methods that were not leading to apparent clinical improvement. In both cases with intravenous salines the plasma chloride levels were raised almost to the normal level, but little or no alteration was effected in the blood urea levels which we believe give a better indication of the severity of the intoxication. (10)

The Management of Jejunostomy in Pyloric Stenosis.

The technique and management of jejunostomy in pyloric stenosis are governed by the consideration that it is a life-saving measure designed to tide the patient over his period of intoxication and to prepare him to withstand at a later date a curative operation of more severe nature. Jejunal feeding is indicated in those cases where little or no progress is being made with the routine methods, and the jejunostomy should be so planned that it will not interfere subsequently with the second operation.

Jejunostomy can be carried out in seriously ill patients under local infiltration with "Novocain" supported by light gas and oxygen anæsthesia. The incision we recommend is a vertical one through the right rectus muscle at the level of the umbilicus, because such an incision leaves the left half of the abdomen free for the subsequent gastro-enterostomy. The peritoneal cavity having been opened, an upper loop of jejunum should be selected and its position in relation to the rest of the bowel rapidly verified. The point chosen for the jejunostomy stoma should be from 45 to 90 centimetres (18 to 36 inches) below the duodeno-jejunal flexure, so as to leave the uppermost loop of jejunum free for the subsequent operation. A number 10 or 12 E rubber catheter is inserted into the bowel so that it rests for a distance of 10 to 15 centimetres (four to six inches) within the lumen. Interrupted silk or fine catgut sutures then approximate the jejunal wall over the catheter for a distance of 3.5 to 5 centimetres (one and a half to two inches). After the proximal end of the catheter has been carried through an avascular area in the great omentum, the jejunum and the omentum are suspended to the

peritoneum by a stitch which encircles the catheter and anchors it in the bowel. Additional fixation may be obtained by wrapping two narrow strips of adhesive tape round the catheter and fixing them to the abdominal wall.

The administration of saline solution should be commenced immediately after operation. In our cases we attached a funnel to the free end of the catheter and from time to time slowly ran in small quantities of saline and glucose solution (1% sodium chloride in 5% glucose). At first only small quantities (100 to 150 cubic centimetres) were given every two hours, and, as they were tolerated, the amounts were increased up to 200 to 300 cubic centimetres. After two or three days we allowed our patients to take small quantities of fluid (milk and water, glucose drinks, orange drinks and later Benger's food) and vitamin preparations by mouth and, as vomiting did not occur, we found that we were able in both patients to dispense with gastric lavage.

With such a régime it is necessary to record the total daily fluid intake and the total daily fluid output in order to ensure that, while an adequate amount of fluid is given and retained daily, the administration of large quantities of saline is not continued too long, lest ædema of the lungs or the extremities develop. The same considerations as were discussed earlier for the routine administration of large quantities of saline hold for jejunal feeding, and it is particularly important that the jejunal administration of saline should be controlled by estimations of the plasma chloride and blood urea made each alternate day.

Wolfer in a recent paper (16) points out that in such conditions as pyloric stenosis with persistent vomiting there is a widespread dietary deficiency embracing not only the water, salt and carbohydrate elements, but to a lesser extent the protein and vitamin elements as well. He advocates the use of the Ivy pabulum (17) in jejunal feeding, and has devised a method of administration in which he uses an electrically driven pump capable of giving small quantities of fluid at slow rates. The pabulum used by Wolfer consists of: whole milk, 1,500 cubic centimetres; cream, 500 cubic centimetres; cane sugar, 150 grammes; wheat flour, 120 grammes; dried peptone, 80 grammes; water, 2,000 cubic centimetres; and to this are added 6 to 12 grammes of salt and a feeding consisting of orange juice and other vitamin-containing foods. This amount contains about 3,300 calories and is intended for a one-day feeding. It does not irritate the jejunal mucosa and forms a balanced diet capable of maintaining health for many months.

We have had no experience with this method, but think it worthy of trial in selected cases after improvement has begun following earlier feeding with saline and glucose solutions. Wolfer has used his method in many different conditions of gastric and duodenal ulceration. In an earlier paper (14) he quotes a case of alkalosis in a patient with duodenal ulceration on whom a jejunostomy was performed. Large quantities of the pabulum were given daily with improvement in the plasma chloride and carbon dioxide combining power values, but without effect on the azotæmia. Death from uræmia occurred some days later. In commenting on this case, Wolfer concludes that had jejunostomy been performed earlier the fatal termination might have been prevented. We cannot help feeling that if for the first few days saline and glucose solutions had been used instead of the rich pabulum, the issue might have been otherwise.

Jejunal feeding should be maintained until the blood chemistry has returned to normal and the daily urine output is adequate (from 1,000 to 1,500 cubic centimetres). When this stage is reached it is safe to undertake gastro-enterostomy, but as long as the tube remains in position there is no need for haste. For this second operation the abdomen may be opened by a left paramedian incision.

SUMMARY.

Uræmic intoxication supervenes in many cases of pyloric stenosis when vomiting becomes copious and persistent. The causal mechanism is one of dehydration and excessive chloride loss associated with the appearance of toxic nephritis. If this intoxication is not first corrected, surgical intervention may result in a fatal issue should the ordinary procedure of gastroenterostomy be carried out.

Eight cases are described illustrating the effects of various forms of treatment. They demonstrate that the usual routine treatment by frequent feeding of liquid food, cessation of alkalis and daily gastric lavage, is not sufficient to correct this intoxication in every case. In many cases the additional administration of saline solution, either rectally or parenterally, is required, and occasionally refractory cases of persistent vomiting are met with in which feeding by jejunostomy is indicated.

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A REVIEW OF ONE HUNDRED CASES OF CANCER OF THE STOMACH.

By F. GORDON BELL, Dunedin.

There is nothing new or original in this article, and those who seek these qualities had better pass it by. It is essentially a "pot-boiler", and the sole justification for submitting it for publication is the hope that it may serve to focus the attention of some reader on the subject of cancer of the stomach.

While some of our Fellows may be able to scan their results in this disease with a justifiable measure of gratification, I am convinced that, as one of the major problems in abdominal surgery, cancer of the stomach leaves little room for complacence. I propose first to present the picture of cancer of the stomach in its worst aspect, and then to offer some suggestions directed towards its better treatment. To this end I have reviewed the histories of the last hundred cases observed in the Dunedin Public Hospital, working backwards from 1936 till I had collected this number. The group has been analysed in certain directions and forms a text for the observations now offered. I have reduced the infliction of tables as far as possible, but make no excuse for the few presented, because they illustrate points which are of interest and value in any discussion on this subject.

The present series may be taken as a fair sample of cancer of the stomach as the disease presents itself in a general hospital, and therefore as it occurs in the community, for in my experience this disease is just as disappointing and the results of surgery are just as humiliating in private as in hospital practice. In this regard the splendid measure of success attained in and reported from certain clinics is a source of envy and a standard for emulation; but I can hardly think that the human material seeking surgical succour in specialized clinics is comparable in all respects with that which claims our attention in the hospitals of this country.

To illustrate the gravity of cancer of the stomach as a cause of death, I will remind you that it is one of the commonest of all cancers, and broadly estimated to account for one case in three of all carcinomata in males and one in five in females. A rough estimate of the annual mortality in Great Britain, the United States of America, Australia and New Zealand would seem to indicate a parallelism in proportion to the population of the four countries (Table I). An apparently rising incidence may be real in part, but in some degree may paradoxically be accounted a triumph of public health, age analysis in the present group showing an incidence of about 20% in persons over seventy years of age.

TABLE I.

Deaths from Cancer of the Stomach.

			England and Wales.	United States of America.	Australia.	New Zealand.
1932	0 0	 	11,712	34,000	1,701 (in 1929 and 1930,	321
1933		 		_	over 2,100) 1,726	376

Approximate Rates per Million of Population.

998 999 985	
286 283 265	250

Analysis of Histories of 100 Cases of Cancer of the Stomach.

I have made no attempt to analyse symptomatology as recorded in the case histories, except to note that fully two-thirds of the primary cancers were of the characteristic insidious type. The analysis has been directed towards the duration of symptoms, age distribution and the percentages of primary cancer and probable ulcer-cancer, and from these factors certain points of interest have emerged. Eighty-one per centum of the cases were of primary cancer, while 19% gave an ulcer-type history, though some of these most probably were cancerous ulcers from the outset.

Duration of Symptoms in Primary Cancer Group (81 Cases).

It is admittedly difficult in so insidious a disease as cancer of the stomach to determine precisely the origin of the symptoms, and we have to be content with approximate accuracy, the patient dating his illness from his first departure from ordinary health.

Table II.

Duration of Symptoms in 81 Cases of Primary Cancer.

					Months					
Under 1	1	2	3	4	5	6	8	9	10	12-24
1	3	19	11	8	1	19	2	6	2	6

Table II indicates that approximately 75% gave a history of six months and under, and 40% a history of three months and under.

One patient, aged thirty-six years, who came with a huge and hopelessly inoperable growth, as confirmed at laparotomy, had worked till a few days previously and admitted to nine days only of epigastric discomfort. Another, coming with a perforated cancerous ulcer measuring five by six centimetres (two by two and a half inches), denied having had any symptoms previous to perforation. The frequent brief history affords scant hope of improving the position by earlier diagnosis and treatment under present conditions of practice.

It is of interest to note that Balfour, $^{(1)}$ in reviewing the case histories of 128 patients who lived ten years or more following resection for cancer, states that in 109 (85%) dyspepsia had existed for a year or more.

Duration of Symptoms in Ulcer-Cancer Group.

The nineteen patients in this group gave a history suggesting that the cancer of the stomach had arisen on an ulcer basis, digestive disturbance of the ulcer type having existed over periods ranging from two to twenty-seven years. Such case histories should be subjected to close scrutiny and particularly so in the short period histories, for however well they may conform to the ulcer type, it is impossible to escape the strong suspicion that they have been cancers from the outset, especially in patients past middle age.

One patient will serve as an example.

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S.J.B., aged sixty-three years, gave a history extending over two years of typical ulcer pain, periodic and relieved both by food and by alkalis. Radiological examination demonstrated a small ulcer on the lesser curvature of the stomach, the appearance not suggesting malignancy. He was treated on a medical repime, improved and put on weight. Four months later, the pain having returned and become almost constant, radiological examination showed a carcinoma crater on the lesser curvature extending into the body of the stomach. Operation was refused.

Five of the nineteen case histories in this group suggest that the lesion was primarily cancer, which reduces the number of probable ulcer-cancer histories to fourteen. This figure, 14% of the total, would appear to me to approach reasonable accuracy, and making due allowance for the suppositious element that must enter into this problem, I think it fair to say that in these hundred cases of gastric carcinoma more than 10% arose on an ulcer basis.

For what it is worth, coming from a single hundred cases, this figure conforms to Walton's (2) recently quoted 10% in 461 cases, and approximates to Stewart's (3) estimate. It falls far short of the oft-quoted figures from other eminent sources, but whatever the precise percentage of ulcer transformation into cancer may be, it is substantial enough to warrant the acceptance of the principle of the surgical removal of chronic gastric ulcer under various circumstances as the chief prophylactic measure against cancer.

TABLE III.

Age Analysis. Ulcer-Cancer Group.

14 Cases.

31-40	41–50	51-60	61-70	71-80
Years.	Years.	Years.	Years.	Years
1	7	4	1	1

50% occurred in the fifth decade.

Intermediate Group with Short History of Ulcer Type (Cancerous Ulcer).

This would appear to be a small but important class, probably a few occurring in any hundred cases. Its importance lies in the fact that the history is superficially like that of ulcer, but differs in that symptoms appear first in middle or later life (Table IV), while the periods of remission are

brief. This variety should be regarded as gravely suggestive of cancer, particularly when medical treatment proves indifferently successful, as it usually does. It is important to remember, however, that such patients may temporarily respond to medical treatment in the most deceptive fashion.

TABLE IV.

Age Analysis. 5 Cases.

46 Years.	57 Years.	59 Years.	63 Years.	
2	1	1	1	

TABLE V.

Age Analysis. 100 Cases.

31-40	41-50	51-60	61-70	71–80	81-90
Years.	Years.	Years.	Years.	Years.	Years
4	16 (8 ulcer- cancer)	25	36	17	2

The analysis indicates that gastric cancer appears most frequently between the ages of fifty and seventy years, *i.e.*, a decade or more later than gastric ulcer. Of sixteen cases of cancer in the decade 41 to 50, half were ulcer-cancers (Table III).

All sets of figures dealing with cancer of the stomach are likely to contain a few examples occurring at unusually early ages, and this group is not exceptional in showing four patients in the thirties. The characteristic rapid progress of the growth when it occurs at an earlier age makes the condition all the more unfavourable.

At the other end of the scale there is a measure of comfort which helps to offset the general wastage due to this disease. In about 20% of cases cancer appeared at the age of seventy years and over, and may almost be regarded as a terminal event. This figure would have been higher but for the exclusion of several aged patients in whom the diagnosis was highly probable but was not confirmed by radiology or autopsy.

RESULTS OF TREATMENT.

Many patients reached hospital with the disease so far advanced that only bare medical palliative measures were possible, and several died within a few days of admission. In more than half, surgical exploration was considered out of the question for good reasons, and in forty-five patients operation was advised and performed as follows:

45	operati	ions-
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Explored and closed as	s ine	pera	able			**	 	 15
Gastro-jejunostomy (an	nteri	or o	r po	steri	ior)		 	 11
Partial gastrectomy							 	 19
Mortality of resection							 	 331%
Alive and well								5

As several resections were done purely for palliation, hope of cure by radical operation existed in less than a third of those submitted to exploration and in considerably less than a sixth of the hundred cases. Even supposing that the five surviving patients are permanently cured, which is improbable, it means that ninety-five have succumbed to the disease, not so much because of bad surgery, but because in the vast majority the disease had progressed beyond the aid of surgery. Maes⁽⁴⁾ makes the same point in saying that ninety-six out of every hundred patients are today doomed to death from the outset of their disease. Herein lies the tragedy and the kernel of the problem. If this group of one hundred cases is a fair sample of cancer of the stomach (and I have no reason to think otherwise from a rapid survey of another batch of records), it is sufficiently evident that it is not from material such as this that surgeons, master or otherwise, can hope to report a high operability rate and 20% of five- to ten-year survivals, which represents the present acme of surgical achievement in this field.

Balfour's⁽⁵⁾ magnificent record just referred to is an ideal to aim at, however remote of achievement. Walton⁽⁶⁾ infers from his tables that cure may be expected in about 6% of all cases that come to operation, but concludes that these figures encourage us to work for better results.

Suggestions for Improving Results in the Treatment of Gastric Carcinoma.

We may well adapt the legal tag, for it is the little things that count in this matter, and the saving of an additional life here and there, by this means or that, is what we may look for, not a dramatic improvement.

Possibilities of improvement fall into two broad categories: (a) points which may aid in earlier diagnosis, (b) points in the management which aid in reducing operative mortality.

The Question of Earlier Diagnosis.

Can earlier clinical recognition of the disease be attained? All recognize that time is the essence of the problem, and every effort should be directed towards getting these victims of cancer at an earlier stage. Average surgery will then be able to record gratifying results, while under present conditions the most expert surgery is impotent. In regard to the problem of earlier diagnosis, Dean Lewis⁽⁷⁾ has aptly remarked:

Patients don't visit doctors, as a rule, unless they are sick, and one cannot make a diagnosis unless one sees the patient.

There is much point in this, and one fears that from the very nature of the disease in its primary form, the majority of patients will continue to come too late for effective surgery. A policy of despair, however, will get us nowhere, and I believe there is reasonable hope of improvement in the following directions:

1. As two-thirds of all primary cancers of the stomach are insidious in origin, more and more regard must be paid to the suspicion of cancer when the practitioner is faced with primary gastric disturbance in middle or later life plus some deterioration in general health, however slight. In these days it is assumed that first-class radiography will be invoked as the greatest single aid in this problem, but in the early stages the result may be negative or equivocal. Until physicians and practitioners are prepared to advise

exploration on reasonable suspicion, the roll of inoperable primary cancers

will remain at its present distressing level.

2. Too little regard is still given to the malignant potentialities of chronic gastric ulcer, for here lies our great opportunity for really curative radical surgery. Balfour, (8) in a review of 128 cases of cancer of the stomach alive and well ten years after operation, states that 50% had an average or raised hydrochloric acid content in the gastric juice—a highly significant point.

It should be accepted as a working rule and taught to students that 10% of chronic ulcer cases incur the risk of cancer. The risk is particularly urgent with ulcers which recur quickly after medical treatment and apparent cure as judged by radioscopy; in the larger sized ulcers which fail to clear up unequivocally as judged by clinical plus radiographic evidence after three weeks' rest and treatment; in ulcers of any size with low acidity or anacidity, and in all ulcers where the train of long established symptoms shows a

suggestive alteration.

3. I would draw particular attention to the patient with a short history simulating that associated with ulcer. The symptoms begin at a later age than is the rule with average ulcer cases, and the periods of remission are too short to be consistent with the presence of true ulcer. These two features alone are so suggestive of primary cancerous ulcer that the doctor should not be lulled into inaction by an apparent response to medical treatment. The question of exploration in this type of case should always be earnestly considered, for most are cases of cancer which, if operated on early, is

likely still to be resectable with good prospects.

4. Propaganda from cancer campaign authorities should be set in train. We live in a changing age, and now that so much is made of cancer, in the press, and so much publicity is given to medical activities in this direction, I believe it would be entirely justifiable to liberate some reasonable pronouncements about cancer of the stomach. In my experience, propaganda is bringing us superficial cancers, such as those of the skin and lip, and also breast "lumps" at an earlier stage, and I do not believe that it has increased the number of cancerophobes. So, with cancer of the stomach there would be reason to hope that a few, though possibly a very few, might present themselves earlier.

So sane a surgeon as the late J. C. Bloodgood (9) wrote on this matter:

The chief problem, therefore, is not one of diagnosis, nor one of surgical technique. The chief problem is to broadcast a message to the adult population that indigestion, if it lasts continuously for more than a week or two, demands the attention of a qualified member of the medical profession.

Propaganda need stress two points only: (i) That digestive disturbance coming out of the blue in a middle-aged or elderly patient who has hitherto enjoyed good digestion is a matter to seek advice about promptly. (ii) That any change of symptoms, such as more continuous pain or absence of relief from previously effective measures in a person who has suffered from chronic digestive disturbance, is again a signal for investigation.

One might add as a corollary that such individuals would be well advised to raise with their medical adviser the question of expert radiological examination; I say expert advisedly, for only this week I have seen a man giving a six months' history with a promising growth of the stomach, who

had a futile amateur examination nearly two months ago.

I am well aware that many view the idea of propaganda with disfavour as being likely to do more harm than good. The fact is that under present conditions the vast majority of primary cancers of the stomach are hopeless by the time they reach the surgeon; we must either accept and tolerate this deplorable position in this, one of the commoner forms of cancer, or else explore every possible avenue of betterment through earlier diagnosis. Education through the family doctor is just an agreeable fiction in this matter.

Certain Points in Treatment Directed Towards Reducing Mortality.

It is by attention to detail that the surgeon may be saved the humiliation of finding in the *post mortem* room some defect of management which has contributed to the death of a patient following resection, where the outlook appeared entirely favourable. The only justification I can suggest for discussing the following points is that a stricter observance of them has enabled me to increase my operability rate and to reduce my mortality. While most surgeons have their fancies in the choice of anæsthesia and in technical details, all will agree on the extreme importance of pre-operative preparation. This and the other points now briefly mentioned are put forward with the idea of attracting attention to detail and of stopping the gaps through which an occasional patient slips.

- 1. Preparation for Operation.—Too little observance is still given to the fact that most patients with cancer of the stomach are poor risks on account of pain, impaired nutrition and persistent minor blood loss. no sense cases for urgent surgery, or to be done on a particular day, regardless of proper preparation because it happens to be the surgeon's operating day. Several days, up to a week, spent in preparation along the lines discussed below greatly improve the chance of a successful result. The essential points are: (a) To relieve dehydration by abundant infusions of glucose-saline solution intravenously and normal saline solution subcutaneously. combat anæmia and diminished hæmoglobin by one or more blood transfusions. Even if the blood picture is little altered, our experience has been that transfusion effects a marked improvement in the patient's well-being. (c) To cleanse the stomach mechanically, and to reduce to some extent infection, cedema and congestion by repeated irrigations. (d) To administer frequent feeds of glucose, fruit juice, soups and other easily assimilable foods.
- 2. Choice of Anæsthetic.—Chest complications contribute materially to the mortality. We consequently rely on local anæsthesia for the abdominal wall, and gas and oxygen and what ether is necessary to allow full exploration, access to the highest part of the lesser curve and closure.

Though this procedure may not be perfect, it is workable and reduces ether administration to a minimum. No doubt, splanchnic analgesia may be better, but I have not mastered it, and I believe that a method must be adopted to permit adequate exploration and examination of the upper reaches and attachments of the growth. I have little faith in half-hearted attempts at exploration under local anæsthesia, for apart from the recognition of such obvious conditions as ascites or peritoneal or liver metastases, I believe the operator may receive a fallacious idea of the possibilities of resection unless he has the benefit of full relaxation. In other words, relaxation may make

all the difference between successful resection and abandoning the patient to his fate.

3. Prevention of Infection in the Field of Operation.—I do not think sufficient regard is paid to the great potentialities for sepsis involved in resection of the cancerous stomach. The septic stomach characterizing most cancers is infinitely more dangerous than the clean stomach associated with most ulcers, and the risks of gross infection in the deeper area and in the parietal wound are greatly enhanced by septic ulcerating growths, in spite of all mechanical cleansing.

The most scrupulous care should be observed to protect these areas by packing and the use of suction. No doubt we all do this, but my point is that it may be done perfunctorily. The abdominal wall is particularly vulnerable (as with the septic appendix), and on several occasions in my own patients I believe the presence of gross infection and breaking down of the wound have turned the scale against a promising result. Whether it is better to abandon layer suture and to close with through-and-through silkworm gut sutures, as Marshall (10) advises, I do not know, but I think there is a good deal to say for it.

4. Technique of Resection.—I make reference to the following point in technique with diffidence, because I know that a difficulty to one man may be no difficulty to others.

My experience has been that most resections are difficult (except for ulcer-cancer), and my personal difficulty has been at the upper end of the lesser curvature, because it is here that time is lost in suturing whole-length anastomoses, and it is here that the greatest risk of breaking down lies, however many "hypnotic" stitches are used. To obtain a more secure and rapid closure of this part I believe there is much to be said for a return to the Billroth II type of resection or some modification of it, such as Finsterer's, in the sort of case we commonly see where the highest possible division of the lesser curvature is required.

Other Considerations.

The attitude of the surgeon, physician and general practitioner alike towards gastric cancer should be of the most resolute character, for there is no other salvation than surgery. This platitude may seem superfluous, but there are some who view this disease with hopeless pessimism. Even patients who reach hospital in an almost moribund condition should receive vigorous restorative treatment, for I have seen post mortem examination in such cases disclose an easily resectable growth and no metastases. Blood transfusions and infusions may restore an apparently hopeless case to a condition of operability.

An adverse radiological report as regards operability is allowed by some (no doubt influenced by the sinister reputation of gastric cancer) to weigh too heavily against exploration. Walters, (11) writing on cases of doubtful operability as judged by radiographic evidence, estimates the margin of error at 10% to 15%. If this margin exists in a clinic where the radiography is supremely efficient, it must be often greater; but even should this be a substantial over-estimate, what remains represents the chance lost of saving an additional few lives otherwise abandoned.

Even the presence of secondary growths of indubitable or highly suggestive character should not bar operation in selected cases. I have seen a patient with hepatic metastases, operated on by a colleague, live five years, three of which were spent in complete comfort, after gastrectomy. Palliative resection, or exclusion, in the presence of metastases sometimes confers a surprising prolongation of comfortable life.

Any surgeon operating on cancer of the stomach as we see it today, must face a high mortality. The reward to persistence, enterprise and experience comes not so much in reducing this mortality rate as in increasing the radical operability rate. Walton⁽¹²⁾ records that his operability rate rose from 27.9% in his first seven-year period to 43.9% in his third seven-year period.

It would be idle to deny that inefficient or irresolute surgery does not contribute to the death of a moiety of the victims of gastric carcinoma. There is all the more reason, therefore, to take stock of the situation, and even if the problem of early diagnosis baffles and continues to baffle us, not to lose, through lack of any precautions, the few chances of success that fortune offers.

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A BRIEF REVIEW OF FUNCTIONAL HYPERINSULINISM, WITH THE REPORT OF A CASE SHOWING IMPROVEMENT AFTER PARTIAL PANCREATECTOMY.

By J. MAXWELL CLARKE, New Plymouth.

INTRODUCTION.

The condition of hypoglycæmia due to hyperinsulinism was first recognized by Banting and Best⁽¹⁾ in 1922. They noticed it in the course of experiments on rabbits, and in man following the use of insulin. Symptoms of hunger, thirst, hyperexcitability, fear and convulsions were noted.

In 1923 Seale Harris⁽²⁾ reported two cases where similar symptoms occurred in non-diabetic patients who had not been treated with insulin, but had a low blood sugar. In 1924 the same observer reported a case which he termed "dysinsulinism". This patient was found to have glycosuria one year and hypoglycæmia the next.

In 1927 Wilder, Allan, Power and Robertson⁽³⁾ described a case where a pancreatic tumour was found with metastases in the liver, from which insulin was extracted. The blood sugar was found to be as low as 25 milligrammes per 100 cubic centimetres of blood. The patient died a few weeks after

operation.

In 1928 Finney and Finney, (4) of Baltimore, removed 22.5 grammes of normal_pancreas from a patient diagnosed as suffering from functional hyperinsulinism. This case is not reported as a success. In 1929 Howland, Campbell, Maltby and Robinson (5) reported the removal of a pancreatic tumour with clinical cure. They also used the term "dysinsulinism", in view of an unusual response to the carbohydrate intake.

Since 1929 numerous cases have been reported. Whipple and Frantz⁽⁶⁾ in 1935 reviewed a total of 38 cases that had come to operation. There were 21 cases of tumour and 17 diagnosed as functional hyperinsulinism.

GLUCOSE TOLERANCE TESTS.

The glucose tolerance tests constitute an important part in the investigation of such cases, and a brief consideration will now be given to some points bearing on their interpretation. Normally the production of insulin is stimulated by impulses which pass along the vagus nerves from the central nervous system. Whereas in normal cases the blood sugar level rises in conformity with the carbohydrate intake, in functional hyperinsulinism the response of the pancreas is out of proportion to the stimulus, and, furthermore, with an increased intake of carbohydrate, insulin is produced in excess and the blood sugar becomes lower (see Figures I and II). J. Allen Berry⁽⁷⁾ suggests that this fact may be used as a differential test between hyper-

insulinism due to a tumour of the pancreas and functional hyperinsulinism. There is a point to be remembered in connexion with the giving of large amounts of glucose by mouth. Physiologists have pointed out that under these conditions the hypertonic sugar solutions may lie in the stomach and extract fluid from the circulation. Thus the absorption of the sugar may be slow.

The production of insulin from a tumour is believed to be uncontrolled by the vagi. On theoretical grounds it has been suggested that the excessive production of insulin might be prevented if insulin were administered as well as carbohydrate; but in Berry's case and in the present one this did not work out in practice (see Figures I and II). Again, on theoretical grounds, starvation might cause a rise in the blood sugar. This was well illustrated in Berry's case, but this test was not carried out in the present case.

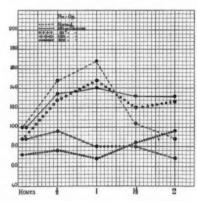


FIGURE I. An average curve with 50 grammes of glucose, and curves in this case with 50, 100, 150, 200 grammes. The striking points are the low figures for the fasting blood sugar in three of the curves, and the low curves with the larger amounts of glucose which were given orally.

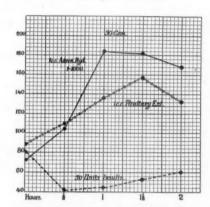


FIGURE II. Curves with 50 grammes of glucose followed by 1 cubic centimetre of 1/1,000 adrenalin, 1 cubic centimetre of pituitrin, and 50 units of insulin, hypodermically. The adrenalin mobilizes glucose from the liver glycogen and the pituitrin has a similar effect. These curves show that there is a reserve of sugar in the body. After the insulin and glucose were given the patient felt very ill.

One of the causes of hypoglycæmia is depletion of the normal reserves of glycogen in the liver, but when reserves are present they may be mobilized by the injection of adrenalin and, to a lesser extent, by pituitary extract (see Figure I).

BLOOD SUGAR LEVELS.

In man the normal blood sugar varies in different individuals, and it may vary in the same individual at different times of the day and in different states of nutrition. It is lower in children under the age of three than in adults. It is higher in the aged on account of deficient storage and a rise in the renal threshold.

In comparing values care must be taken that the same method of investigation has been used, and that the blood is of the same variety, i.e.,

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venous, capillary or arterial. Arterial and capillary blood give similar figures. but venous blood commonly gives a figure twenty to thirty milligrammes

In general, the normal fasting level should not be under 95 milligrammes per 100 cubic centimetres of blood. A level lower than 95 indicates hypoglycæmia. Symptoms are not probable till a level of 80 or 70 is reached. Above 65 the symptoms usually are slight. Coma usually occurs at levels below 45, but there are many exceptions and there is no exact correspondence between the severity of symptoms and blood sugar levels. A rapid fall of blood sugar may produce symptoms that are not expected at the actual level as found at blood examination.

CAUSES OF HYPOGLYCÆMIA.

There are many causes of hypoglycæmia other than hyperinsulinism. The following table from Wauchope(8) appears to be complete:

1. Excess of insulin.

Therapeutic injections. Tumours and hyperplasia of the pancreas. Functional hyperinsulinism.

2. Lack of opposing secretions.

Disease of the suprarenal glands. Pituitary tumours of the posterior lobe. Anterior lobe pituitary lesions (acromegaly). Myxœdema.

3. Lack of glycogen.

Destruction of reservoirs as in liver disease or wasting of muscles. Abnormal excretion of sugar, as in renal diabetes and lactation. Active depletion of stores, e.g., muscular exercise. Failure to replenish stores as in starvation.

4. Interference with regulating centre. Nervous disease affecting the pons.

In the present case functional hyperinsulinism appeared to be the probable diagnosis. It is interesting to note that Professor Best(9) is very critical of the diagnosis of functional hyperinsulinism, and of the operation of partial pancreatectomy to relieve the condition, unless a tumour is present or hyperplasia or hypertrophy of the islets can be demonstrated. He bases his opinion first on the work of Houssay(10) and others, whose experimental work in animals indicated that hypofunction of the anterior lobe of the pituitary gland could cause hypoglycæmia, and, secondly, on the indifferent results of operative treatment which had come to his notice in cases of functional hyperinsulinism in which there was no detectable lesion in the pancreas. Further reference will later be made to the result of treatment in these cases.

REPORT OF PRESENT CASE.

The patient was a dairy farmer, aged thirty years, and was admitted to the

New Plymouth Hospital under Dr. C. A. Taylor, who diagnosed the condition.

For three or four years the patient had been constantly tired and weak, and perpetually hungry. He wanted to eat every two hours. If he were four hours without described his case as one of intense asthenia. He had lost about twenty pounds in weight in six months prior to admission to hospital. For about four hours during the day he had to go to bed. His weakness was worst before meals. Ingestion of food relieved the weakness, but was followed by giddiness. His diet was the ordinary mixed diet of farmers.

He had the following other symptoms, which were elicited by leading questions. He was troubled with blurring of vision of the right eye, by hot flushes, by attacks of palpitation and by frequency of micturition. Sometimes his mouth was dry, while sometimes salivation was excessive. The dryness was noticed especially in the early morning. He was depressed, irritable and difficult to live with. He was inclined to loiter and waste time over his work. Sometimes he had difficulty in forming his words. Occasionally he had tonic contractions of the flexor muscles of the ulnar aspect of the forearm.

The symptoms in this case are fairly representative of those which are found in this condition, but in more severe cases drowsiness, stupor, coma, convulsions, excitability or maniacal behaviour may occur.

On examination the patient was a man of medium build, thin, and with a tired expression. He had no goitre. Urinalysis gave normal findings. There was no reaction to the Wassermann and Kahn tests. The urinary diastase was normal. The visual fields were also normal. Skiagrams of the chest and pituitary fossa showed no abnormality.

Pre-Operative Treatment.

Five hundred cubic centimetres of 10% glucose solution were given half an hour before operation. One-sixth of a grain of morphine with one one-hundredth of a grain of atropine was given at the same time.

Anæsthetic.

Five and a half cubic centimetres of "Avertin" were given, followed by spinal anæsthesia by means of 1.8 cubic centimetres of "Percaine" one in two hundred in glucose solution; 1.5 cubic centimetres of 3% ephedrine hydrochloride were given five minutes before and immediately after injection of the "Percaine" (Silverton's "bechnique). Splanchnic anæsthesia was induced with 40 cubic centimetres of 1% "Novocain" with adrenalin, by the anterior method. Local anæsthesia was also used, 60 cubic centimetres of 1% "Novocain" with adrenalin being bathed round the pancreas.

Operation.

Operation on the patient was carried out on February 14, 1936. A transverse supraumbilical incision was used, following the method of Whipple and Frantz. The gastrocolic omentum was divided and separated from the transverse colon. The pancreas was exposed through its whole length and examined for the presence of tumours, but none could be found. These, when present, are said to be of a reddish colour.

The inferior mesenteric vein was identified as it passed posterior to the pancreas to join the splenic vein. This was very intimately related to the pancreas, and the same feature was noted on other occasions on the cadaver prior to the present operation. This intimate relationship of the inferior mesenteric vein to the pancreas appears to be one difficulty in resecting large portions of the pancreas. Berry is the only other contributor known to me who mentions this point.

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The first step in resecting the pancreas was to mobilize it by dividing the peritoneum at the lower border, beginning towards the tail. The tail was difficult to bring up into the operative field, even with the use of the back lift as for cholecystectomy or with traction by ring forceps. Some minutes were spent without much progress. The spleen was then brought forward after the division of a few fine adhesions to the diaphragm, and with gentle traction on the spleen the tail of the pancreas came forward easily. The spleen was next removed. The splenic vein was defined and ligated distal to the inferior mesenteric vein, but the splenic artery was not visible at this point.

After a consultation with Dr. Taylor as to the amount of gland which should be removed, the pancreas was clamped with a light right-angled intestinal clamp, about one inch beyond the inferior mesenteric vein, and the distal portion, which looked a very large amount, was removed in a wedge-shaped piece. On being weighed immediately this was found to weigh 35 grammes.

The clamp slipped at this stage, and the splenic artery showed its presence with a violent spurt of blood. The vessel was embedded in the gland. The bleeding was easily controlled, and the vessel was ligated with silk. This was the only time in the operation where there was any trouble with hemorrhage. The suggestion of Dr. Emil Holman, of ligating the splenic vessels and removing the spleen, as mentioned by Whipple and Frantz, (6) is, I feel sure, a very valuable one.

The raw surface of the pancreas was oversewn with two layers of number 3 chromicized catgut, and a few independent sutures of silk were also placed. The use of silk and catgut together is usually to be avoided. In this case, however, I used both. A continuous suture affords better control of oozing hæmorrhage than interrupted sutures, and the suture material must preferably be absorbable; but, lest the digestive action of the traumatized pancreas should cause early absorption of the catgut, some silk sutures were also added. Whipple and Frantz⁽⁶⁾ used silk only, but apparently did not use a continuous suture. Free drainage was provided by rubber dam brought out through a separate stab wound. The wound was closed in the usual manner.

The patient stood the operation well. He was given 500 cubic centimetres of saline solution with 25 grammes of glucose after the operation. On his return to the ward his pulse rate was 140, but it soon settled down to just over 100. He was allowed up on the twentieth day after operation. Blood sugar estimations were made at various

steps during the operation and afterwards. These are recorded in Figure III.

Twenty-three days after his discharge from hospital the patient was readmitted with the complaint of painful swelling over the drainage site. This area was firm to the touch, but the swelling was more subjective than objective. It was explored, lest there should be a deep collection of fluid. Nothing abnormal was found other than fairly dense fibrous tissue.

RESULTS OF OPERATION.

Whipple and Frantz, (6) in their excellent review, had found 49 cases in the literature to that date showing hypoglycemia, where the pancreas had been examined at operation or autopsy. There were 31 cases of tumour and 18 cases without tumour. Of the 31 tumour cases, the presence of the tumour was confirmed at autopsy in 10 and at operation in 21. Of the operation cases there was improvement or cure in 19, while two patients died. The percentage of good results is thus very high, namely, 90.5.

In the cases without tumour, 17 came to operation, but in only 12 had resection of the gland been performed and sufficient time elapsed to evaluate the results. Four patients were improved, seven were unimproved and one died. The percentage of good results is low, namely, 33\frac{1}{3}. Since then

Berry's case⁽⁷⁾ is to be added to the list of improved cases.

TABLE I.

Improved Cases.

Glandular Tissue Removed.	Author.				
 80-90% resected. Excision of half body and tail. Subtotal resection of tail and body. 60 grammes resected (islets hypertrophied). 28 grammes removed. 	Graham and Hartman. S. Harris (Drennan). Thomason. Simon. Berry.				
TABLE II. Unimproved Co					
Glandular Tissue Removed.	Author.				
1. 22 · 05 grammes. 2. 14 grammes. 3. 8 grammes and pancreas clamped. 5. (a) Resection, 1928. (b) Excision of nodule in 1932. Amount not recorded. 6. Resection. Amount not stated. 7. 7-2 grammes.	Finney and Finney. Allan Boeck and E. S. Judd. Allan Boeck and E. S. Judd. Judd, Allan Rynearson. Holman, Railsback and E. S. Judd. Evans and McDonough. Ziskind (Bayley).				

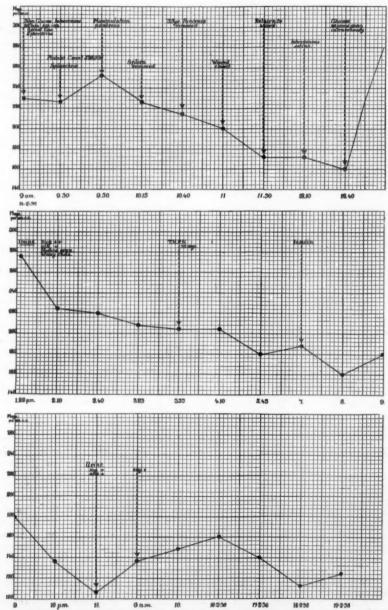


FIGURE III. Blood sugar readings during and immediately after operation. The blood sugar remained high. There was thus nothing to fear in this case from undue production and absorption of insulin due to handling of the pancreas at operation.

It is now important to note the amount of gland that was removed in these cases, and it would seem that a much greater amount was removed in the cases associated with a successful outcome than in the unsuccessful ones, although in several instances the weight of glandular tissue removed is unfortunately not recorded. To be successful the operation must be radical, and it does not seem to be any use to remove small amounts of gland.

The patient under present consideration is greatly improved. He can now carry out an ordinary day's work, working from 4 a.m. till about 8 p.m. He is free from his feelings of weakness and from the unpleasant feelings

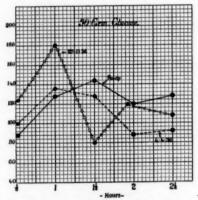


FIGURE IV. Curves with 50 grammes of glucose pre-operatively, 38 days after operation, and over 9 months after operation.

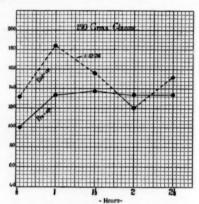


FIGURE V. Curves with 150 grammes of glucose pre-operatively and over 9 months after operation. A 200-gramme test was tried, but it is difficult to get patients to take such large amounts of glucose, as the intense sweetness is nauseating. It was not successful in this case post-operatively.

before and after food. He has lost his irritability, and has recovered his normal personality in the home. He has put on nearly 6.3 kilograms (a stone) in weight. One symptom still remains. He still has the tonic spasms of the flexor muscles on the ulnar aspect of the forearm.

The post-operative glucose tolerance tests show more normal curves, although in the 50-gramme curve there is a curious dip in the curve after one and a half hours. This feature, together with the persistence of the flexor spasms, indicates possibly that a larger amount of gland should have been removed at operation. The weight of a normal pancreas is said to be from sixty to one hundred grammes. In a man of the size and weight of the present patient the weight of the pancreas would probably not be more than eighty grammes. The removal of thirty-five grammes thus means a big loss of pancreatic tissue, but still it would probably have been better to remove more. It appears to be very difficult to convert these patients into diabetics.

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GAS ANÆSTHESIA: A CRITICAL SURVEY OF GAS ANÆSTHETIC TECHNIQUE.

By Douglas G. RENTON,

Honorary Anæsthetist, Alfred Hospital, Melbourne; Honorary Anæsthetist, Austin Hospital, Melbourne; Honorary Assistant Anæsthetist, Melbourne Hospital.

Successful anæsthesia with any anæsthetic agent and with any technique of administration is dependent on one fundamental factor, and that is the provision of an absolutely patent airway, allowing of free and effortless entry and exit of the anæsthetic mixture to and from the lungs. With the attainment of this objective, respiration is carried on by the patient with the expenditure of the minimum of energy. Any resistance in the respiratory tract upsets the evenness of the anæsthesia, increases muscular rigidity, necessitates the use of a greater amount of anæsthetic, and causes wasteful dissipation of energy. When the anæsthetic is administered from a piece of apparatus, the natural corollary is that the anæsthetic mixture must be presented to the patient in such a way that there is no expenditure of energy in obtaining the mixture from the apparatus. It is proposed to deal with this latter aspect of the problem, and to attempt to assess the comparative value of various types of gas anæsthetic apparatus and technique.

It will be necessary first to describe briefly the main characteristics of the different anæsthetic gas machines. There are two main types: first, the constant flow machine, and, second, the intermittent flow machine.

THE CONSTANT FLOW ANÆSTHETIC GAS MACHINE.

Examples of constant flow machines are the Foregger Metric, the "Austox" and the Safety Gas.

This type of machine delivers a constant flow of a mixture of anæsthetic gas and oxygen, the proportions of which can be adjusted at will. The mixture is led into a reservoir bag placed between the machine and the face mask. The flows of anæsthetic gas and of oxygen are measured by the displacement of columns of water against calibrated scales, with an independent control valve for each gas.

THE INTERMITTENT FLOW ANJESTHETIC GAS MACHINE.

Examples of intermittent flow machines are the McKesson machine and the "Austox" dental and maternity models.

This machine delivers anæsthetic mixture only during inspiration. The supply is automatically shut off during expiration by the transmitted pressure of exhalation acting on a flutter valve. With the release of this pressure and the application of the transmitted negative pressure of inspiration, the flutter valve is lifted and the gas mixture inhaled from the machine. The composition of the mixture is determined by the setting of the single control in the

head of the machine. The machine is connected to the face mask by a length of rigid rubber tubing.

1. TECHNIQUE WITH A CONSTANT FLOW ANÆSTHETIC GAS MACHINE.

The mixture of anæsthetic gas and oxygen is led into a reservoir bag placed between the machine and the face mask. In practice, there is a considerable variation in the position chosen for the bag in relation to the mask:

(a) The bag may be connected directly to the mask.

(b) The more common practice is to connect the mask to the bag by varying lengths of more or less rigid wide-bore rubber tubing.

In the former method there is a direct wide connexion between the mask and the bag. There is no friction to be overcome; hence no effort is required to inhale the mixture from the bag. As an economy measure, a certain amount of rebreathing is usually allowed to occur. No effort is required to exhale. Portion of the exhalation escapes through the exhaling valve. The remainder passes directly into the bag, where it is immediately and intimately mixed with the whole contents of the bag. Oxygen is extracted evenly from the mixture, and carbon dioxide is built up evenly if rebreathing is allowed wholly or in part. The alterations in the gas mixture, therefore, are gradual. The theoretical objection that the bag may be an obstacle to the surgeon is not supported by experience in anæsthesia for thyreoid surgery.

In the second method respiration takes place through a longer or shorter rigid tube. An orifice of a diameter of three-quarters of an inch will allow free respiration. If, however, this area of passageway be prolonged, as in a length of rigid-walled tubing, friction does occur and effort is required to carry on respiration through it. The amount of friction (and therefore the amount of effort) depends on the area of the passageway, the length, the volume of gas passing and the speed of its passage (i.e., the volume, depth and rate of respiration).

If an attempt is made to overcome friction by supplying the mixture at a positive pressure, inspiration will be aided. Expiration, however, whether back into the bag or out through the exhaling valve, is rendered more difficult, so that there will still be an unnecessary expenditure of energy.

Owing to the length of tubing between the mask and the bag, the amount of expiration which reaches the bag and mixes with its contents is diminished according to the capacity of the tube. A proportion of rebreathing occurs in the tube, and the gas exchange in the bag is limited. Hence, the oxygen content of that portion of the mixture actually inhaled becomes depleted and carbon dioxide built up more rapidly than when the bag is connected directly to the mask. There is not the same free gas exchange owing to the confinement of so much of the mixture in the tube, so that the gas changes in the mixture are irregular.

The "closed circle" administration of the gaseous anæsthetics, with absorption of carbon dioxide by soda-lime, is a further development of constant flow technique. The method depends on the fact that the anæsthetic gases are absorbed and excreted through the lungs chemically unchanged. Anæsthesia is induced by leading a mixture of anæsthetic gas and oxygen into a closed system from which air is excluded. Respiration occurs to and from the system. After anæsthesia is established, no further anæsthetic gas

is added except to replace that lost by leakage. Oxygen is added to the system in a continuous flow in sufficient quantity to maintain adequate oxygenation. The carbon dioxide excreted is removed chemically from the system by passing the exhaled mixture through a filter of soda-lime.

The Absorption Unit.

Two soft and elastic corrugated kink-proof rubber tubes of extra wide bore (one inch internal diameter) lead from the face mask. They are valved so that inspiration direct from the reservoir bag passes through one tube. Expiration is led off through the other tube to a control tap, by means of which it may be diverted:

 Out from the system, through a non-return valve, whereby the system may be emptied.

Through the soda-lime filter, whereby carbon dioxide is chemically removed from the system.

Straight back to the bag, whereby rebreathing occurs, with the accumulation of carbon dioxide in the system.

During the maintenance of anæsthesia, under ordinary conditions, the soda-lime filter is in continuous use, preventing the accumulation of carbon

dioxide in the system.

The main feature of the anæsthesia during the maintenance stage is the peacefulness of the respiration. The rate is slow, usually eighteen to twentyfour per minute, and the respiratory movements are quiet, resembling those observed during sleep, in contradistinction to the forceful respiration frequently associated with gas anæsthesia. Quiet respiration is of great convenience to the surgeon, particularly when he is working in the upper part of the abdomen. The colour of the blood is kept bright throughout. The pulse is slow and of good volume, and the rate usually sixty to eighty per minute. There is no rise in blood pressure from stimulation by carbon dioxide, and any fall in blood pressure with the progress of the operation occurs more slowly and is of less extent than with other methods of administration. The skin is warm and dry. There is no loss of fluid through sweating, and no loss of heat through evaporation of sweat. The use of extra wide bore, soft elastic, corrugated, kink-proof tubing practically eliminates friction. In the comparatively short metallic portion of the unit the passages are wide, the minimum diameter being three-quarters of an inch, and offer little resistance to respiration. The quietness of respiration also reduces friction. For these reasons the patient wastes no energy in breathing to and from the unit.

In the methods so far described, the machine delivers the anæsthetic mixture into a reservoir from which the patient breathes.

2. Technique with an Intermittent Flow Anæsthetic Gas Machine.

The technique with an intermittent flow machine differs radically from that with a constant flow machine in that the anæsthetic mixture is breathed directly from the machine, which is connected to the face mask by a length of rigid tubing. This tube offers resistance to respiration, the amount depending on its area, its length, the volume of gas passing and the speed of its passage (or, in other words, with the volume, depth and rate of respiration). Furthermore, effort is required to lift the flutter valve of the

machine during inspiration, so that the patient actually has to "work" to obtain the mixture from the machine.

If rebreathing is abolished, by throwing the rebreather out of action, the expiratory effort will correspond to the tension of the exhaling valve, while with the technique of fractional rebreathing advocated by McKesson, expiratory effort is required to overcome the friction in the tube corresponding in amount to the proportion of rebreathing employed.

To overcome inspiratory resistance, it is usual to deliver the mixture at a positive pressure. In this case expiration, whether occurring out through the exhaling valve or along the rebreathing tube, is impeded by an additional amount depending on the pressure of delivery. On physiological grounds, expiratory effort is less harmful than inspiratory effort. It is necessary, therefore, that some degree of positive pressure be used. Respiratory effort is, however, the main factor in the causation of muscular rigidity, being a far more frequent offender than is lightness of anæsthesia. It is always accompanied by forceful respiration, with increase in its depth and rate. This tends to accentuate the resistance to respiration offered by the tube and machine.

As an economy measure, fractional rebreathing is usually employed. McKesson advocated rebreathing to within two hundred cubic centimetres of the tidal respiratory volume. This amount of rebreathing allows of the accumulation of sufficient carbon dioxide to afford active stimulation to the respiratory centre, as a result of which process the depth and rate of respiration are further increased and respiratory resistance augmented.

CONCLUSIONS.

It is possible to arrange in order of merit the different methods of administration of the gaseous anæsthetics. The criterion chosen is the amount of energy expended by the patient in obtaining the anæsthetic mixture. For general surgery, the fatigue produced by the anæsthesia follows in the same order, which is as follows:

- The "closed circle" absorption technique. The absence of stimulation by carbon dioxide gives this method definite preference.
- The continuous flow technique with the mask directly connected to the bag.
- The intermittent flow technique at a positive pressure just sufficient to overcome the inspiratory resistance of the tube and machine.
- The continuous flow technique, with the tube between the mask and the bag.
- 5. The intermittent flow technique at atmospheric pressure.

In dealing with robust patients, the wastage of a certain amount of energy may not be of vital importance, but in the poor anæsthetic risk group, *i.e.*, the aged, shocked, and acutely ill, those of low cardiac reserve, and so on, it assumes considerable gravity, and may be the determining factor in the issue of the surgical treatment.

There are, however, certain operations in which the question of conservation of energy is rendered of relatively secondary importance by the nature of the operative procedure, and in which the intermittent flow technique offers features which are advantageous and, in some cases, absolutely essential for safety.

1. Chest and Pulmonary Surgery.

In chest and pulmonary operations the position of the patient on the operating table is often far from ideal for anæsthesia from the anæsthetist's point of view. Moreover, there is frequently only one lung available to carry on respiration and anæsthesia, while mediastinal displacement, due to pneumothorax or to wide opening of the chest, may interfere with respiratory function. For some of these patients mask anæsthesia is adequate, but for the remainder endotracheal administration is essential. With either technique an ample reserve of pressure is indispensable in order to maintain oxygenation and anæsthesia. At times, in fact, there may be a complete absence of respiratory effort by the patient. Lung ventilation is then dependent on the ability of the anæsthetist to deliver the anæsthetic mixture or oxygen at a positive pressure.

2. Brain Surgery.

Anæsthesia for brain surgery may be described best as "anæsthesia by guess and by God". The wound is available for inspection. With difficulty, access to the wrist for observation of the pulse and blood pressure may be gained. Owing to the drapings, the only indication of respiration is afforded by the movement of the rebreathing bellows of the McKesson anæsthetic machine. These patients often develop sudden and dramatic respiratory failure, necessitating artificial respiration with oxygen under pressure. This can be done efficiently with the intermittent flow machine. Endotracheal nitrous oxide and oxygen is the anæsthetic of choice for these cases, and has replaced local anæsthesia at the Alfred Hospital neurosurgical clinic.

Amongst the many advantages derived from this change, the following are worthy of mention: the mental stress, to both the patient and the surgical team, is lessened; efficient artificial respiration may be applied without delay; the anæsthetic per se has little influence in the production of shock, which in these cases is largely the result of hæmorrhage. In patients with high intracranial pressure there is often a curious instability of the cardiovascular regulating mechanism which manifests itself in a slowly progressive fall in the systolic and diastolic blood pressure and the pulse pressure, usually associated with a progressive slowing of the pulse rate. Transfusion of blood has no restorative effect in this condition of fatigue. Nitrous oxide and oxygen anæsthesia plays no part in the production of this state, as it occurs with equal frequency under local anæsthesia.

3. Dental and Oral Surgery.

Oral and major dental surgery are performed most satisfactorily under endotracheal anæsthesia. Gas anæsthesia for minor dental surgery is obtained by administration by the nasal route under pressure. For this technique an intermittent flow machine is essential.

4. Obstetrical Analgesia and Anæsthesia.

For the self-administration of nitrous oxide during the first stage of labour, an intermittent flow machine is required.

5. Thyreoid Surgery.

In general, efficient anæsthesia for thyreoid surgery is obtained by the closed circle or the constant flow technique. Respiration is obstructed by certain complications during the operation, e.g., pressure on the trachea, distortion, collapse or opening of the trachea, or spasm of the larynx from damage or destruction of one or both recurrent laryngeal nerves. The resultant interference with respiration may be momentary and respond to the temporary abandonment of the operation until respiration again becomes satisfactory. It may, however, persist. It will then be necessary to intubate the larynx and maintain oxygenation and anæsthesia by the endotracheal route.

Anæsthesia by an intermittent flow machine has some advantages when any of the above complications occur, as anæsthetic mixture or oxygen may be administered at an increased pressure and forced into the lungs past the obstruction. The use of this type of machine does not abolish completely the necessity for intubation, but will reduce the frequency with which this procedure is needed.

As a general rule, anæsthesia with the face mask is indicated for thyreoid surgery, where the theoretical advantage of endotracheal administration is outweighed by the increased post-operative morbidity following its use. (1)

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These conclusions are the result of the study for nine years of gas anæsthetic problems and a certain amount of experience in the manufacture of gas anæsthetic apparatus. They are offered as a contribution to the subject of the selection of the ideal types of anæsthesia for the various types of surgery.

(The following gas anæsthetic machines have been used over the period of this study:

Constant flow type: the Safety Gas machine, the "Austox" machine, the Foregger Metric machine, home-constructed modifications of the "Austox", a soda-lime absorption unit of home construction.

Intermittent flow type: the McKesson indicating "Nargraf" machine, the "Austox" dental and maternity model.)

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THE ÆTIOLOGY OF PHLYCTENULAR OPHTHALMIA.

By SIR JAMES BARRETT, Melbourne.

Dr. Coverdale's interesting article on "The Ætiology of Phlyctenular Ophthalmia" (1) calls for notice, since he refers to its infrequency in New Zealand and asks whether it is prevalent in Australia. It is rarely seen now, but was common years ago. I have long been convinced, after having listened to many discussions, that it has no direct relation to tuberculosis, but is influenced by the same condition which predisposes to tubercular infection, namely, malnutrition. I have, for practical purposes, come to regard it as a deficiency disease due to insufficient protein food, especially meat. On a properly balanced diet it usually disappears rapidly, and I imagine that the full diet of the average Australian accounts for the great diminution in the number of cases seen.

It is now almost a curiosity, but in the days when so many girls seemed to live mainly on tea and bread and butter it was quite common.

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Surgical Technique.

A METHOD OF EXTRACTING SECONDARY CAPSULAR CATARACTOUS MEMBRANE.

By R. GRANVILLE WADDY,

Sydney.

It has been my experience that a discission or needling operation is one of the most difficult intraocular operations, inasmuch as one can never be certain of the end-result, or of the location where the fragments of capsular remnant will eventually lie at rest. The operation is performed in order to leave the pupil area untrammelled by an interposing veil or curtain and if, as in discission, this curtain be rent and torn, no one can predict with certainty the ultimate location of the remnants. The operation is fundamentally weak in that it leaves behind something we really need to extract.

fundamentally weak in that it leaves behind something we really need to extract. Various types of forceps have been devised for the operation of mechanically removing the capsular $d \dot{e} b r i s$ from the anterior chamber, but I find most of these unsatisfactory, primarily because they are large and cumbersome, if only comparatively so; in all cases a large keratome incision is essential to allow of a proper and sufficient

opening of the blades prior to closing them to grip the rubbish.

I conceived the idea of using a hook and ended by seeking what I needed in the nerve broaches employed by dentists for the extraction of devitalized nerves from teeth. These are made and procurable in different sizes, and may be purchased in an assorted set of half a dozen. They are really fine, tapering and flexible steel wires, some, like Davidson's, with a small wooden handle, others being fitted into a detachable metal grip. The distal third of the wire is scored or barbed in a spiral in such manner that it will not grip or cling in a forward movement, while on a backward pull the barbs become most tenacious of any material with which they come in contact. Experiment with a few threads of cotton wool or a piece of gauze will demonstrate this quality. In the natural state they are rather too lengthy, and should be shortened so that only some four millimetres of the barbs remain.

The operation is performed as follows. A keratome incision is made, some two millimetres in width. The pupil should be widely dilated, and the most suitable cases are those in which an iridectomy has been performed, so that the instrument can enter the anterior chamber in front of the site of the iridectomy and thus avert risk of its becoming entangled in the iris. Little difficulty will be experienced in forcing the broach into the anterior chamber and engaging it with the capsular remnants. A few twists of the handle will serve to entangle the remnants in the barbs and, after slight movement, the capsule will usually tear away from its peripheral attachment and a lot of it will come away with the broach as it is withdrawn through the keratome incision. There is a tendency for the barbs to engage the corneal wound and resist extraction, but unless the keratome incision is too short, little difficulty will be experienced in withdrawing the instrument, together with the entangled debris. Slight pressure on the posterior lip of the corneal incision with an iris repositor will serve to open the wound and facilitate removal of the broach. I have thought of using a fine cannula to overcome this slight difficulty.

The indications for the operation are cases of opaque capsular membrane, of the tougher and denser type. I would never think of using it for the fine veil type of membrane, which is elastic and can be readily and satisfactorily opened with a Bowman's needle. Nor is it advocated as a routine procedure, but rather as an operation for occasional use in those cases in which a band or flap in the pupil area is still present after needling, or those with a dense membrane which the operator considers should be

removed from the anterior chamber.

One great advantage of this method, as compared with the use of a needle, is that the vitreous suffers little, if at all, during and from the operation, whereas when one or two needles are used the anterior portion of the vitreous frequently has to be torn backward and forward in the endeavour to break or tear an obstinate and resilient band of capsular membrane.

Case Reports.

A SUGGESTED AID IN THE TREATMENT OF CLEFT PALATE IN OLDER CHILDREN OR ADULTS.

By RICHARD FLYNN,

Sydney.

In view of some of the difficult problems which confront the surgeon in the management of cleft palate in older children and adults, the following case history, with a new method of narrowing the cleft pre-operatively, is reported.

The patient, M.J.H., female, aged ten years, consulted me for the repair of her cleft palate. At birth she had also had a hare lip, which had been repaired satisfactorily while she was still an infant. She was wearing an obturator which had been made by her dentist, and which completely prevented any narrowing of her palatal cleft by the muscular pull of her lip. Figure I is a photograph of the obturator that the patient was wearing.



Photograph of obturator made by dentist for closure of cleft.



Photograph of splintsuggested new method of narrowing an excessively wide cleft.

I felt that her condition could be improved, so she was admitted to Lewisham Hospital on April 25, 1936. As her mother stated that anæsthetic difficulties had arisen sufficient to cause discontinuation of the operation at three previous attempts to close the palatal defect at another hospital, a radiograph of her chest was ordered, on which the radiologist reported as follows: "No abnormality seen in the thorax."

Under intranasal ether anæsthesia the first stage of Denis Browne's operation for repair of cleft palate was carried out, namely, removal of the tonsils by dissection and division of the posterior palatine arteries. As the left lateral and incisor

teeth were pointing straight forward, they were also removed.

As her bony cleft was very wide, it appeared that if some method of narrowing it could be designed, it would greatly help the surgical closure. I felt that instead of performing a Brophy operation, the purpose of this operation might be accomplished by another method, which so far as I am aware is original. Accordingly, two open ferrule dental metal splints were made, one for each side of the alveolar cleft, and then joined across the cleft by a bolt and nut. By means of gradual tightening of the nut, the two parts of the splint would be approximated, and it was thought that from the constant pull the sides of the cleft would be drawn nearer together. doubt whether the teeth would yield rather than the maxilla, but I thought the method was worth trying. The child was therefore referred to the United Dental Hospital

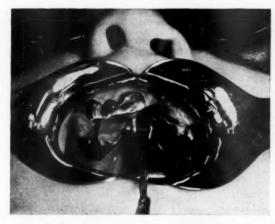


FIGURE III. Photograph of splint in mouth.

of New South Wales, and Mr. Harris, of that hospital's staff, kindly made for me the splint shown in Figure II and cooperated with me in the subsequent treatment of the patient.

The width of the gap in the palate was measured at intervals, and dental models of the cleft were also made. Figure III shows the splint in position in the mouth, and Figure IV is a photograph of impressions of the cleft at different dates, and shows well how the gap in the palate narrowed.

On November 9, 1936, the second stage of Denis Browne's operation was carried out, with this difference, that approximation and suture of the soft palate only was attempted. After the wound was healed the patient was allowed to go home for a holiday.

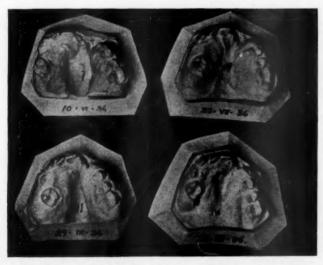


FIGURE IV. Photograph of impressions of cleft at different dates subsequent to the use of the splint.

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 She returned to hospital some months later, and on March 8, 1937, a flap of mucoperiosteum was raised on either side from the hard palate and displaced medially, but as it appeared that the flaps would be under more tension than was advisable, they were allowed to fall back into position and the principle of delayed flap was adopted. A fortnight later these flaps were again raised and sutured. The wound healed quite satisfactorily.

As is often noticed in patients with hare lip and cleft palate, the upper lip hangs as the string of a bow rather than as the bow itself, and it did so in this patient. Accordingly, on April 12, 1937, the method suggested by Gillies and Kellner was followed



FIGURE V. Photograph of prosthesis used by the patient.



FIGURE VI. Photograph of prosthesis in position.

in attempting to improve the contour of the patient's upper lip. A Thiersch graft was taken from the inner side of the upper arm and applied to an impression taken in dental compound, which in turn was fixed to a dental splint that had been made previously. The patient was allowed to wear this splint for about fourteen days, and after it was removed it was seen that the graft had taken well.

Finally, the patient was fitted with a dental prothesis bearing teeth and built up to keep the contour of the upper lip. Figure V shows this prosthesis, and Figure VI is a photograph of it in position.

The patient has now been referred to Miss Wray for speech reeducation.

EXTREME DISFIGUREMENT RESULTING FROM OPERATION ON FRONTAL SINUS, CORRECTED WITH GRAFT OF RIB CARTILAGE.

By BRYAN FOSTER, Melbourne.

The accompanying photographs illustrate the severe disfigurement following operation on a large frontal sinus of each side (Figure I), and the result of an attempt, at a subsequent operation, to restore the normal contour of the brow (Figure II). Figure I was taken about eighteen months after the first operation.



FIGURE I. Showing patient before the grafting.

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FIGURE II. Showing the patient's appearance after the grafting.

It should have been taken more in profile to give a better idea of the depth of the furrow across the forehead. Figure II was taken about six months after the insertion of rib cartilage.

The prominent symptoms of chronic frontal sinus suppuration, local pain, headache and purulent nasal discharge, vary in severity in different cases. When local pain and headache are severe and persistent, relief can be expected only from some form of operation. In the Killian operation and its modifications a bridge of bone is purposely left at the orbital margin to conserve the contour of the brow, with the result that an underlying space persists and relief from symptoms lasts only so long as secretion and discharge find an escape. The sinus space must still be regarded as a chronic abscess which is unable to collapse, and the necessary drainage can be maintained, in many cases, only by the subsequent persons of housing as intervals or by other intrapased measures.

subsequent passage of bougies at intervals or by other intranasal measures.

Permanent relief from symptoms and without subsequent treatment will
usually be obtained when the whole of the outer bony wall of the sinus is
removed to allow the soft parts to fall in and obliterate the cavity. The obvious



FIGURE III.

objection to this method, which I shall refer to as the "obliterating operation", is the resulting disfigurement.

The anatomy of the frontal sinus varies within wide limits, and the degree of disfigurement to be expected depends mainly on the size and disposition of the sinus; for example, operation on a sinus having a deep supraorbital recess combined maximum vertical and lateral extensions would result in a major degree of disfigurement. This question of disfigurement cannot be regarded lightly. One has to bear in mind that the patient, particularly a female patient, may, forgetting the pain she had and remembering only her disfigurement, decide that the cure is worse than the disease; and the patient's friends are likely to consider they have ample excuse for criticizing the surgeon who inflicted the scar.

Notwithstanding the reluctance the surgeon has to performing the obliterating operation, the condition of the sinus wall may leave him no choice. Necrosis may be extensive and involve the orbital ridge, so that no sound bone can be left to form a bridge.

The following are notes of a case (the subject of the photographs) in which

any operation, short of the obliterating operation, would have been useless. S.L., a female patient, aged twenty-five years, a patient at the Alfred Hospital, was found to have extensive nasal sinus disease. Operation on antra and ethmoids was first performed. Severe headache, forehead tenderness and copious purulent nasal discharge from the right side persisted. Œdema of the brows, most pronounced on the right side, developed. Operation on the right frontal sinus was performed in July, 1934. The outer wall of the sinus was found to be extensively necrosed. The sinus cavity was unusually large. There was a deep supraorbital recess, a lateral extension as far as the external angular process, and a high vertical extension. The inter-sinus partition had ulcerated through, forming a wide communication with the left sinus, which was itself hopelessly diseased. The skin incision was extended and retracted to give access to the left sinus, which was of the same shape and extent as the right sinus. It was necessary to remove the whole of the outer wall of each sinus, including the glabella, the inter-sinus partition and part of the roof of each orbit. What remained of the degenerated mucous membrane was lifted or rubbed off the inner sinus wall. A small gauze wick was placed along the floor of each sinus to effect drainage to the outer angles of the wound. A pad of wool wrapped in gauze was shaped and bandaged to push the soft parts into the depression and obliterate any potential space. The gauze wicks were removed within a few days, and healing was rapid, with soft parts adhering to the underlying bone.

Following this operation the patient was completely relieved of pain and purulent nasal discharge, but she became so worried by her appearance that it was agreed something should be attempted to improve matters. I had previously not had satisfactory results with fat grafts, and so, although the site did not appear altogether favourable on account of the poor blood supply available to the inner surface of a graft, it was decided to use cartilage.

On July 21, 1936, at operation an incision was made on the right side of the forehead extending vertically from the external angular process. Through this incision the soft parts were elevated from the depressed area. The lower rib cartilages were exposed, the perichondrium was elevated from either the sixth or seventh and cartilage three and a half inches in length was removed. In obtaining the cartilage required, with a minimum of damage, it seemed better to use a stout knife in preference to rib shears.



FIGURE IV. X ray photograph showing the graft in position.

The removed cartilage was inserted into the bed prepared in the forehead. It required the whole length and breadth of the cartilage to fill the furrow, only a slight paring down of its upper edge was necessary to bring it flush with the forehead above. The cartilage was partly cut through and fractured by a green stick fracture at the appropriate distance from each end to enable it to take the lateral curve of the brow. A little manœuvring brought the graft into the position which best corrected the deformity. There was no unfavourable reaction or untoward post-operative incident worth recording, and the patient was up and about in eight days.

Six months after the second operation the patient stated that she and her-

friends were pleased with the final result.

A case resembling this case in the extensive necrosis of the walls of both frontal sinuses and in which I had to perform an obliterating operation, was recently reported from my Alfred Hospital clinic. (1)

Summary and Conclusions.

1. A large cartilage graft can survive and prosper in an exceptionally large depression resulting from a double obliterating operation on the frontal

2. In my opinion the obliterating operation offers the best prospect of permanent cure in cases of chronic frontal sinus suppuration which call for some form of external operation.

3. The risk of serious disfigurement of the patient deters surgeons from

more frequently employing the obliterating operation.

4. When dealing with a comparatively small cavity, especially when it is limited to one side, it should be possible with cartilage graft to reduce disfigurement to a negligible degree.

5. To ensure that the area is free from infection, an interval should elapse after the obliterating operation before the graft is introduced.

Reference.

(1) Clifford L. Rosefield: "Frontal Sinus Suppuration with Extradural Abscess", The Medical Journal of Australia, February 20, 1937.

PRIMARY CARCINOMA OF THE JEJUNUM: REPORTS OF TWO CASES.

By ALAN E. LEE,
Brisbane.

PRIMARY neoplasms in the small intestine are, of course, extremely rare. So unusual is primary adenocarcinoma of the jejunum that Maingot, in his "Post-Graduate Surgery", states that in 41,883 consecutive post mortem examinations in Vienna no example of this condition was found. Not only, then, can no surgeon expect to see more than one or two of these cases in his professional life, but it must be supposed that the syndromes enumerated in text-books as pertaining to such a state are based rather on theoretical deductions than on practical experience. The remarkable experience, then, of having the professional care of two patients with such a condition in one year is surely worthy of record.

Case I.

This man, a carpenter, aged forty-nine years, was first seen on April 5, 1937,

with the following history:

He had been quite well up till the previous Christmas eve, when he suddenly became dizzy and fell down. Though he had quickly improved, recovery had been incomplete and he had felt weak ever since. He remembered that following these symptoms his motions were tarry black. He had had no indigestion at any time, and could eat anything. During the past three months he had gained 6.3 kilograms (fourteen pounds) in weight, and now weighed 67.5 kilograms (ten stone ten pounds). During the past month he had some cramping pains across the lower abdomen, generally at night when he was in bed.

The hæmoglobin content of his blood was 50%. Radiographic examination following a barium meal showed no abnormality as far as the hepatic flexure of the colon, while similar investigation of the large bowel showed nothing more unusual than a few small diverticula in the sigmoid colon. Examination of the fæces for intestinal parasites

was negative.

An attempt was made to treat the anæmia with iron, but on April 14, 1937, ten days after his first consultation, he developed very acute pain of a mid-gut colic type, and operation was deemed essential, the most probable diagnosis seeming to be acute appendicitis supervening upon subacute appendicitis, with melæna from an acute duodenal ulcer due to focal sepsis of appendicular origin.

Exploration following laparotomy revealed no abnormality in the right iliac fossa, but when the hand was passed upwards a mass was felt in the left upper part of the abdomen beneath the transverse colon. Investigation revealed a stenosing lesion of the jejunum about 7.5 centimetres (three inches) below the duodeno-jejunal flexure, evidently

due to a neoplasm. No metastases could be found.

The affected segment of gut was removed. This involved section of the jejunum just below the flexure, and in such a position that end-to-end union seemed impossible. The upper end was therefore closed with three layers of chromic gut sutures. Owing to the fatty infiltration of the transverse mesocolon, a duodeno-jejunostomy did not seem a practicable procedure, and an anterior antecolic isoperistaltic gastro-jejunostomy was therefore made. During ligation of the mesentery of the resected jejunum a vessel began to bleed in the depths of the abdomen at the root of the mesentery. It was caught with forceps, and in order to save time they were left in situ, and the remainder of the abdominal incision was closed.

In spite of the fact that the patient's hæmoglobin value was only 43% at the time, he made a good recovery from the operation. During the following six days some vomiting occurred and the stomach was washed out on several occasions, large quantities of bile being obtained. He looked well and expressed himself as feeling very well. Fluid feeds were gradually begun, and some at least were retained. On gastric lavage seven days after the operation, contrary to the condition found on all previous occasions.

no bile was obtained, but only a small quantity of milk and clear gastric secretion. About 2 p.m. that day the patient was seized suddenly with excruciating upper abdominal pain, rapidly spreading into the lower abdomen, and on examination a few minutes later he showed the typical board-like rigidity associated with intestinal tract perforation. He exhibited such an extreme degree of shock that operation seemed impossible, and, continuing to go downhill, he died eight hours later.

So much for the clinical history. During the week following operation I had been much concerned as to whether regurgitation of bile through the pylorus could continue indefinitely as the process by which bile would pass from the liver to the intestines, and I had blamed the vast quantities of bile entering the stomach for most of his post-operative vomiting. The absence of bile on the occasion of the last gastric lavage now seemed to possess special significance, and I imagined that a prolonged pyloric spasm must have occurred, preventing regurgitation and so raising the tension within the closed duodenal loop that rupture of the closed end had occurred, with the rapidly fatal ending that sometimes accompanies gross biliary extravasation. Although this is the official end of the story and the accepted explanation of the fatal happening, I was able to obtain evidence later that an altogether different series of events actually occurred.

In the isoperistaltic antecolic anastomosis, which had been placed as far away from the affected area of abdominal cavity as possible, the exit loop passed directly under the paramedian incision, and after removal of the artery forceps on the bleeding mesentery this loop had become attached to the bare area of the abdominal wound, with subsequent kinking. This obstruction of the afferent loop had become so complete that pressure in the stomach and duodenum was raised sufficiently to rupture the blind end and cause extravasation of stomach contents, and not of bile. In fact, the stomach was so free of bile that it seemed probable that the increased duodenal pressure had inhibited its secretion. Had I made an antiperistaltic instead of an isoperistaltic union it seems probable that the man would have been still alive.

The resected specimen resembled in all respects the corresponding adenocarcinoma of the stomach. An ulcerated growth two inches in diameter encircled two-thirds of the lumen of the gut in such a way that an acute angulation was produced in the base of the growth and thus in the jejunum. Dr. J. V. Duhig reported the histological character of the growth as that of adenocarcinoma, grade II.

Finally this case presents a problem of which more experienced colleagues may know the solution. The question is: can the procedure carried out, which necessitates the constant regurgitation of bile and pancreatic juice through a normal pylorus, be followed by normal gastric function with no gastric discomfort, or, if a similar case is ever encountered, must a duodeno-jejunostomy be performed?

Case II.

The patient, a female, aged sixty-two years, single, was seen for the first time on October 2, 1937, in consultation with Dr. L. J. J. Nye, at the Brisbane Clinic. The previous history contained nothing of note, except that stones had been removed from the gall-bladder in 1927, but as the patient had collapsed under the anæsthetic, the operation had not been completed, the gall-bladder being drained.

She had nevertheless remained well till two weeks previously, when she suddenly developed nausea and vomiting, which awakened her from sleep. The vomiting continued during the next fortnight, recurring every second or third night, awakening her between 2 a.m. and 5 a.m. There was no pain at night, but during the day she began to experience pain in the lower abdomen half an hour after food. The bowels were regular. She gradually began to vomit every day, but only once, either in the early morning or occasionally late in the afternoon. Before vomiting she had a heavy feeling in the epigastrium, this discomfort sometimes amounting to pain.

Her blood pressure was 190/105. Radiological examination showed a poorly functioning gall-bladder, while a further examination after a barium meal showed a large six-hour gastric residue in a long, J-shaped, completely atonic stomach, a large regular atonic duodenal cap, and also some dilatation of the second part of the duodenum. The meal could be expressed readily from the stomach through the duodenum. A diagnosis of gastric hypotonicity was made and appropriate measures were instituted. The patient was of a nervous type, and a functional explanation of the vomiting seemed to me probable, though Dr. Nye was still suspicious of some obscure organic lesion. On her discharge from a private hospital on December 3, 1937, her condition was noted as being unchanged.

On January 16, 1938, I was asked to see the patient in a medical ward at the Brisbane Hospital. At this time she looked very much more sick than previously, and had clearly lost much weight. She stated that the vomiting had continued, associated with more or less pain. There was no general abdominal distension.

The previous radiological examination so definitely eliminated the presence of a high obstruction at the usual sites, and the absence of any distension made the presence of a low obstruction so improbable, that surgical treatment was still not advised. Within a few days, however, there could be no doubt that a high obstruction was present and becoming complete, and after treatment by twelve hours' continuous intravenous saline drip had been carried out, the abdomen was rapidly explored on January 19, 1938.

The uppermost jejunal loop was greatly dilated, and about fifteen centimetres (six inches) below the duodeno-jejunal flexure a mass could be felt in the gut, attaching it to the mesentery on the posterior abdominal wall. Exposure revealed a stenosing growth either attached to a gland high in the mesentery or involving the mesentery by direct infiltration. The attachment was producing an acute kink of the first jejunal

loop, apart altogether from any constriction caused by the growth.

Radical removal being clearly hopeless, a lateral anastomosis between the loops of gut on either side of the obstruction was carried out and the abdomen closed. The continuous intravenous saline drip was continued, with intermittent inhalations of

"Carbogen"

The patient's pulse was very poor in volume and extremely rapid when she left the theatre, but within twelve hours it was again of good volume. Twenty-four hours after operation her temperature was 39.4° C. (103° F.), and the pulse rapid and of good volume, but she was practically unconscious. Four hours later the temperature was 41.7° C. (107.1° F.), and she was comatose. Between this time and her death eighteen hours later she remained comatose, with a temperature ranging between 41.2° C. (106° F.) and 41.7° C. (107° F.). It was thought that some cerebral embolic state had occurred to account for this terminal complication. Post mortem, however. no abnormality in the brain could be found.

Notes made by the pathologist, Dr. J. V. Duhig, were as follows: "There are dense adhesions around the gall-bladder. Carcinoma of the jejunum is present, a small papillary ulcerating growth extending round two-thirds of the lumen of the bowel. There is a jejuno-jejunostomy isolating the loop of gut containing the growth. anastomosis is intact and there is much mesenteric thrombosis. Histological examination of growth shows a highly anaplastic grade IV adenocarcinoma. Two lymph glands

in the drainage area show no deposits.'

The naked-eye appearance of this growth was quite similar to that in Case I, namely, a rigid-based ulcer-cancer with heaped-up edges, quite similar to the

corresponding lesion in the stomach.

In an effort to determine whether the diagnosis in this case might have been made at an earlier date, the radiographs taken in November were reexamined. chance a film taken with the patient in the supine position showed an excellent mucous membrane pattern of the distal portion of the duodenum and the upper jejunal loop. By comparison with control films it was positive that no state could be discerned in these films that was not present in films of normal jejunum. It would appear, therefore, that short of exploratory laparotomy at a much earlier date, for which no sound indication existed, the growth was undiagnosable at a stage when its radical removal was possible.

A comparison of the signs and symptoms in these two cases, so similar from a pathological viewpoint, does not suggest the probability of a syndrome, sufficiently clear-cut to be of help in future cases, being recognizable. In the first case the onset of melæna as the first sign of ill-health is of ominous significance, as indicating that. as with the similar gastric growth, considerable symptomless development can occur.

Moreover, the symptoms precipitating operation were in no way different from those associated with vastly more common types of mid-gut obstruction.

In the second case the earlier symptoms were quite indistinguishable from much commoner types of painless vomiting, while symptoms precipitating operation, though definitely favouring the presence of high intestinal obstruction, were too late in development to allow of radical procedures being possible.

In short, consideration of these two cases suggests that, apart from drawing attention to the possibility of such a condition, a future case, unless obstructive signs developed earlier, may well prove equally difficult of recognition at a stage when curative measures are possible.

The Australian and Mew Zealand Journal of Surgery.

All articles submitted for publication in this journal must be typewritten and double or treble spacing should be used. Each article should conclude with a brief summary and statement of conclusions. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without any abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given, with full date in each instance.

When illustrations are required, good photographic prints on glossy gaslight paper should be submitted. Line drawings, charts, graphs and so forth should be drawn on thick white paper in indian ink. Authors who are not accustomed to prepare drawings of this kind, are invited to seek the advice of the Editor if they are in any doubt as to the correct procedure. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available.

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JULY, 1938.

No. 1.

THE NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL.

The formation of such a council as the Federal National Health and Medical Research Council, for the purpose of instituting inquiries into national health problems and to encourage medical research, has long been overdue in this country. This council has, however, now started its activities, following preliminary discussions and the grant of £30,000 per annum from the Federal Government. Its activities must be of interest to all Fellows of our College, which is represented on the council by the writer. In the first place, the council has by resolution chosen several important activities for particular attention. These are maternal morbidity and mortality, tuberculosis, the hygiene of childhood, rheumatism, leprosy, the control of blindness, poliomyelitis and dental caries. Special expert subcommittees have been appointed to advise and to report on these important problems, and there can be little doubt that a successful attack upon any of them would be of the greatest significance The council is particularly in the attempt to improve national health. impressed with the importance of combating disease in childhood, and no doubt will be able to do a great deal in this respect, once the cooperation of the various States is obtained. Of more direct interest to our College are the purely research activities. The council has already approved a large

number of university departments, hospitals and institutions as being fitted by reason of adequate facilities and proper supervision and control, to carry out the type of research needed in this country. It has been recognized that there is a great need for the encouragement of young medical graduates to take up medical research as a career, and this has now been made possible by a system of junior and senior full-time research fellowships at a good salary. The junior fellowships carry a remuneration of £500 per annum for a period of three years, provision being made for the payment of a technician for each fellow, and for a grant for materials. After this period, it will be possible to assess whether the graduate is capable or not, and whether he is willing to advance into the senior fellowship field with a salary of £1,000 to £1,200 per annum. In addition, part-time fellowships are available to any approved graduate at a smaller figure, while grants are also made to workers in existing approved institutes or departments, in the belief that many workers already trained and skilled in a particular type of work may need financial assistance to help them to complete their investigations. Realizing, too, that technical assistants are just as essential as graduate workers, the Council has instituted the policy of making grants to approved institutions for the training of technical assistants pari passu with the development of a body of research workers. Existing research departments have also been helped in many other ways, while some university fellowships, which owing to their small annual value have been more or less frozen assets, have been augmented to make them attractive to young graduates. council has already made numerous grants for 1938 to various research workers and institutions. All requests for research grants come before a reference subcommittee, which satisfies itself on the following points:

- 1. The ability of the applicant to carry out the proposed research.
- 2. The value of the research, whether in progress or contemplated.
- The question whether adequate facilities are available at an institution approved by the council.
- The question whether adequate and skilled supervision by a person trained in similar research methods is available.

The response in the present year has been most gratifying, and there can be little doubt that the stimulus thus given to medical research generally and the growth of knowledge concerning our national health problems, will be of the greatest value to this country. It is hoped that all Fellows of the College will realize that the Research Council has started most auspiciously, and that they should all give their interest and support and so do something to help on this truly national effort.

Surgery in Dther Countries.

[In this column will be published short résumés of articles likely to be of practical value from Journals published in other countries and not readily accessible to surgeons in Australia and New Zealand.]

THE FORMATION OF AN OPENING IN THE ARTICULAR CAPSULE IN INTERMITTENT HYDRARTHROSIS OF THE KNEE.

J. Podio: Atti e Memorie della Societa Lombarda di Chirurgia, February 5, 1937, page 155.

Podio has opened the articular capsule of the knee of a man, aged forty-four years, who, for the last ten years, suffered periodically from a hydrarthrosis of the left knee. The case was one of arthritic deformity with articular creakings, small exostoses on the femur condyles and the tibia, and calcification of both the inner meniscuses.

Following the technique of Payr, after lateral internal arthrotomy, Podio cut away an egg-shaped segment of capsule and synovial membrane. The edges of the defect were everted and sutured to the fibres of the vastus internus muscle. Two days later the affected area showed a large red patch on the inner side of the thigh, which extended to the triangle of Scarpa. In forty-eight hours this patch had disappeared. The hydrarthrosis has not improved much (operated on fourteen months ago), but in the first months after the operation the same eruptive phenomenon has reappeared every twentieth day, becoming progressively weaker.

According to the hypothesis of Schlesinger, the author regards this periodical hydrarthrosis as an irritation of the synovial membrane by the poisonous products of disintegration.

J. ASSALI.

Analysis from Journal de Chirurgie, Volume 50, Number 3.

CLINICAL AND ARTERIOGRAPHIC DIAGNOSIS OF TEMPORAL LOBE TUMOURS.

W. Löhr and T. Riechert: "Schläfenlappentumoren, ihre Klinik und arteriographische Diagnostik", Zentralblatt für Neurochirurgie, Volume ii, January, 1937, page 1.

The authors describe a method of determining both the position and the type of tumours of the temporal lobe by the injection of "Thorotrast" into the carotid arterial system of the side affected. They point out that the employment of ventriculography in many cases is dangerous on account of the rise of cerebrospinal fluid pressure. Arteriography is free from this danger. There is thus a special field of usefulness for this method of outlining the vascular system of the brain. In suspected tumour of the posterior fossa in which neurological examination has not definitely located the lesion, ventriculography may prove of great value, but arteriography would not help because of the failure of filling of the vessels in that area. Only exceptionally is it desirable to inject the vertebral artery for the purpose of outlining the vascular tree in the posterior fossa.

Vascular tumours, vascular anomalies and aneurysms are especially suitable for demonstration by arteriography. In older people in whom a diagnosis between arteriosclerotic changes and tumour is difficult, the method is also applicable. The injection is made into the internal carotid artery. The common carotid is injected only in cases in which the middle meningeal artery is to be demonstrated; for example, in skull injuries. Six cubic centimetres of "Thorotrast" are injected into the internal carotid artery and suffice to produce a good arteriogram. Twelve to fifteen cubic centimetres are required if a complete picture of both internal and external arterial trees is to be shown. It is fortunate that in cases of right temporal tumour, in which the neurological examination is often inconclusive, arteriography is of exceptional value. A well defined picture of the normal

arrangement of the arteries in this region is established. On injection of the internal carotid artery, the two principal branches which fill are the anterior cerebral artery running along the inner side of the hemisphere as the artery of the corpus callosum and the middle cerebral artery, which courses along the under surface of the brain into the Sylvian fissure and then turns over the anterior pole of the temporal lobe onto the outer surface of the hemisphere, breaking up into its numerous branches to supply temporo-frontal and parietal lobes. A significant change in the arrangement of the arteriogram will be seen in disorders of the temporal lobe. It is possible to distinguish between changes in the blood vessels produced by general brain damage as a result of tumour and those caused locally by the tumour itself. Perhaps only a portion of the vascular tree is filled or the vessels appear spastically contracted. A blurred outline of the vessels may be seen. The whole tumour side may have an opaque "unstained" appearance, that is, a lack of definition of the vessels may be noted.

The retention of "Thorotrast" in the capillaries, due to a slowing down of the stream in the neighbourhood of a tumour, is a valuable sign. A special point to be noted in cases in which brain pressure and altered circulation due to a temporal tumour are present, is the filling of both anterior cerebral arteries.



FIGURE I.



FIGURE 11.

Normally only the anterior cerebral artery on the side of injection is filled, but in cases of middle fossa tumour an overflow into the opposite anterior cerebral artery may occur. Such a condition would not be present if there were an equally distributed pressure in the skull, that is, as in internal hydrocephalus occlusus. In temporal lobe tumours, on the other hand, the anterior cerebral artery on the side injected may be absent from the skiagram, whilst the similar artery of the opposite side is well filled, or the homolateral anterior cerebral artery may be deformed and narrowed.

The arteriographic findings have a special value in localization. For example, the internal carotid syphon may be stretched and pressed down by the tumour into the basal area. These changes are manifest also in the vessel in the Sylvian fissure (Figure I). In a lateral skiagram the middle cerebral artery appears to be pushed forwards and upwards, so that it approximates to the pericallosal artery. In large tumours the whole of the centre of the Sylvian group of vessels is acutely bent; in smaller tumours only a portion of the stream appears to be kinked, and in the rest of its course the artery resumes its normal appearance. In antero-posterior skiagrams changes are constantly seen (Figure II). The internal carotid, after its entry into the cranial cavity, instead of coursing parallel to the orbital wall, appears to be pushed upwards.

In antero-posterior views under normal conditions the middle cerebral and the anterior cerebral arteries form a right angle; but in cases of temporal lobe tumour the angle is reduced to 45° or less. An accurate localization and an indication of the direction of growth of the tumour of the temporal lobe are

thus obtainable. A pushing forward of the whole carotid syphon is seen in tumours of the anterior pole of the lobe. Not only the site, but also the nature of tumours, may be determined by this method. As would be expected, vascular tumours such as meningiomata may be distinguished from gliomata. The vessels in the vicinity of the meningioma may be seen, and thus the operation can be planned accordingly. In malignant tumours the picture is quite different. A stagnation and "holding up" of the "Thorotrast" are the rule. Veins may be filled as well as arteries, a vague, opaque and ill-defined mass.

Differential diagnosis from tumours in other parts of the brain is not difficult. In frontal lobe tumours pressure from above and antero-posteriorly will alter the appearance of the carotid system. In parietal lobe tumours the lateral picture will show the line of the Sylvian vessels approximating that of the anterior cerebral vessels. In occipital tumours the terminal branches of the Sylvian vessels are pushed upwards, and in the presence of large growth the whole carotid syphon may be pushed forward. Cerebellar tumours may, if they are large, affect the outline of the peripheral branches of the Sylvian vessels. The vessels may be stretched as an expression of the internal hydrocephalus accompanying such growths. The authors have employed the method in sixteen proven temporal lobe tumours, and they are enthusiastic concerning its value. No untoward effects of "Thorotrast" injection have been noted.

A. E. COATES.

THORACOPLASTY WITH EXTRAFASCIAL APICOLYSIS.

Dr. Carl Semb (Ulleval): "Thorakoplastik mit extrafascialer Apikolyse", Der Chirurg, February 1 and 15, 1937.

THORACOPLASTY is primarily a treatment of a diseased lung containing a cavity or cavities; and must, to be successful, be based on three cardinal principles. It must produce a complete collapse of the cavity; it must act selectively on the portion of the lung containing the cavity; and it must be accompanied by a mortality rate of not more than 1% or 2%.

The great majority of cavities (about 90%) are in the upper lobe, and over 80% are situated towards the posterior border. Thoracoplasty is therefore used mainly in conditions involving the apex of the lung. The surgeon adopting it should aim at copying the mechanics of an ideal adhesion-free artificial pneumothorax, he should try to secure a concentric collapse of the apex in all three dimensions.

The majority of the earlier techniques failed to fulfil these conditions, and apicolysis has been added. If apicolysis is done in the plane between the endothoracic fascia and the parietal pleura, a space is left which fills with secretion from the wound and with air. On the absorption of the secretion and air the lung again expands and the permanence of the apicolysis is lost. Any such space must be avoided, and therefore practically the whole length of the ribs should be resected, though removal of the vertebral transverse processes leads to later scoliosis and is not necessary. It is also necessary to divide the muscles which are attached to the ribs for their expansion, the scaleni, serratus anterior, and the intercostals and levatores costarum. The bands of tissue linking the extrapleural fascia to the sheaths of the great vessels, to the mediastinum, and to the vertebral bodies, along with the intercostal vessels and nerves, must also be cut, for the complete mobilization of the chest wall. Once this has been thoroughly done, the formation of new bone in the ribs makes the collapse permanent.

The cases in which thoracoplasty is needed are those in which it is much safer to take for the apicolysis the outer rather than the inner plane. In these cases dense adhesions are present between the pleura and the extrapleural fascia, and the separation is not done in that plane, as it is in the outer plane, under direct vision. Semb has had no accidents in more than 200 cases; in this number are included 16 cases in which a previous thoracoplasty performed by the earlier methods had to be carried out afresh.

The procedure of the operation is as follows. 1. The third (occasionally the fourth) rib is resected and then the second and first ribs are successively removed. 2. Apicolysis is performed. 3. If necessary, the lower ribs are resected. The resection of the upper three or four ribs does not upset the patient much. The lower ribs may be removed either at the same sitting as that at which the apicolysis

is performed, or at a later stage. Three to five, or at the most six, ribs may be

removed in the one sitting. Paravertebral "Novocain" anæsthesia, following on injection of 0.001 gramme morphine, and 0-0003 to 0-0005 of scopolamine, is very satisfactory. ripan" may be used as an extra aid in restless patients. The "Evipan" incision is a paravertebral one, reaching from one to two centimetres above the spine of the scapula, and carried round the angle of the scapula below. It must be generous enough to give full access to all the ribs required. The levator scapuli and rhomboideus minor muscles are spared, but the serratus anterior is cut through close to its origin from the upper ribs. The scapula can now be drawn forwards upwards and laterally, and an excellent view of the whole operation field, including the axilla and towards the sternum, is thus obtained. The parts of the ribs in front of and behind the angles are removed separately, the operation being made easier by the use of the special instruments illustrated (see Figure 1). The third rib is the first to be removed, the second following it, the anterior point of section being at about the cartilaginous junction. The first rib is mobilized by dividing the scaleni (medius and posterior). Its posterior part is stripped and cut through. The insertion of scalenus anterior is isolated by dissection and divided, and the anterior part of the rib now comes up into the wound; it is carefully stripped of periosteum until its cartilage comes in sight. It is at this stage that the greatest danger lies, the subclavian or innominate veins lying very close to the plane of dissection. A special claw-shaped raspatory is used, the surgeon working away from the vein toward the cartilage, which can usually be separated by it without the use of any shears. The posterior part of the rib is disarticulated and cut through in the same way as the others. If the patient's condition is good, a short piece of the fourth rib may also be removed before the apicolysis is done.

When the ribs are removed it is easy to see how the lung is held by firm fibrous bands to the sheaths of the nerves and vessels and to the vertebræ, and also how true collapse is prevented by the rib periosteum and the intercostal muscles, vessels and nerves. The intercostal muscles of the upper ribs are divided at the vertebræ, and pieces about an inch long are removed. The intercostal vessel nerve bundles are now clearly visible, and they are dissected out and cut. The fibrinous bands running to the vessel and nerve sheaths from the lung apex are freed with special dissecting forceps. These vary greatly in their development. In the absence of much peripleuritis they can be freed from above down by blunt dissection; but if there is much peripleuritis they must be ligated and cut. They exist at definite sites—behind and around the nerve plexus, between the plexus and the subclavian artery, and between the artery and the vein—and they often contain vessels. Further forward bands are often found between the scalenus anterior and the pleural dome; these must also be divided. bands may be found between the apex and the vertebræ, round the neck of the first rib to the transverse process and the body of the vertebra. These may be very tough and fibrous. While the tissues are being separated downwards, the periosteum of the ribs must be cut through close to the vertebræ, as well as the intercostal fascia with the vessels and nerves. The adhesions of the lung apex to the mediastinum are generally looser, and can be separated by blunt dissection, but this is not always so. The periosteum of the first rib near the sternum will generally need to be divided, and sometimes one or two centimetres of it removed. Occasionally the same is necessary for the second rib. The lung will now collapse down to the level of the third or fourth rib behind, and the apex is seen lying free, covered only by the endothoracic fascia and the divided structures of the chest wall. The collapse can be carried further down, but except in the presence of low-lying posterior cavities this is not needed. It is often advisable, however, to separate the lung posteriorly to below the level of the fourth rib, thus projecting the whole mobilized apex forward. The first stage of the operation may well end here, a kidney-shaped pad being bound into the axilla to maintain pressure on the collapsed structures.

If further rib removal is thought wise, it can be left to a second stage. This is best performed within a month of the first, but can be done a year or more later if necessary. The mortality rate rises with the number of ribs beyond four removed at the one sitting with the apicolysis. By limiting this stage to the first three or four ribs, a mortality rate of nil in 68 cases has been attained. With the removal of five ribs one patient among 35 died, with the removal of six

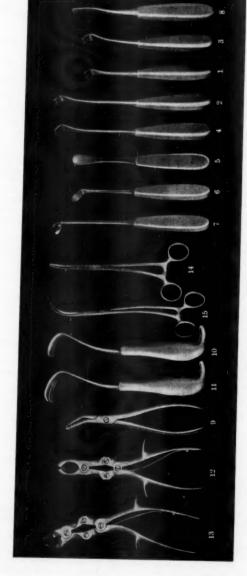


FIGURE I. Showing list of instruments used.

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5 and 6.-Modified Ollier's raspatories.

7.-Claw-shaped raspatory (Semb). 8.-Chisel-shaped knife (Semb).

9.—Semb's rib-holding forceps. 10 and 11.—Semb's retractors.

12.-Gouge forceps (Semb).

13.—Curved rib shears (Semb).
14 and 15.—Semb's special dissection forceps.

ribs two among 53 died, when seven ribs were removed four among 28 died, and with the removal of from nine to eleven ribs the mortality was three among 15. Lung complications follow the same proportion approximately, and this is understandable when the diminution in respiration and expectoration function is taken into consideration. This loss of lung function following extensive rib resection must be taken into account when the operation is being planned.

ARTHUR E. BROWN.

THE IMPROVEMENT OF RESULTS OF PROSTATECTOMY.

P. Janssen: "Wie kann man die Mortalitätsziffern der Prostatektomie weiterhin verbessern?", Zeitschrift für Urologie, Volume xxxi, April, 1937, page 228.

The author asks how mortality statistics of prostatectomy may be reduced. He states that success in prostatectomy depends on the technique of the surgeon, the details of after-treatment, the choice of operable cases and the anæsthesia. So far as technique is concerned, it is presumed that the surgeon who performs such an operation is fully equipped for this purpose. So long as the enucleation is performed in the proper plane, bleeding should never be severe. Accurate attempts at sutural hæmostasis are not favoured by the author. In severe bleeding a tight tampon of styptic gauze applied for five to ten minutes is all that is necessary. Such tampons should never be left in place, as they become wet and loose, and therefore worse than useless.

General, rather than merely local, after-treatment of the patient is of tremendous importance. Within the first day or week after operation some disturbance, probably endocrine, causes depressed psychological states, so that

moral as well as physical support is indicated.

The danger of thrombosis and embolism after this operation interests the author very much. He believes that the spread is from the saphenous or femoral vein, rather than from the peri-prostatic plexus. The patient should be allowed to sit up as soon as possible, even at the end of one day, with movement and massage of the lower extremities. Knee pillows, however comfortable they may be, should not be used, since they tend to obstruct the popliteal vein and to prevent free venous circulation. The danger of actual embolism is, in the opinion of the author, much increased by the modern habit of administering drugs by the intravenous route. However, this possibility of danger must not be allowed to influence the surgeon when the need for the intravenous route is urgent, or when for some reason the alimentary canal is not available.

Of especial importance in connexion with post-operative mortality are selection of operability of patients and the choice of time for operation. There should be no hurry to operate, since drainage by catheter or suprapubic drainage is available. Before operation is undertaken, the urine should be clean and the

renal efficiency satisfactory.

General anæsthesia with ether is favoured, but should give place to spinal or local methods if chest complications are feared. Spinal analgesia is, however, contraindicated, if serious circulatory disturbances exists.

R. J. SILVERTON.

Reviews.

REGIONAL ANATOMY.

A Short Manual of Regional Anatomy. By J. A. Keen, M.B.; 1937. London: Longmans, Green and Company, Limited. Demy 8vo, pp. 167, with 76 illustrations. Price 5s. net.

The purpose of this little book is to enable the reader rapidly to cover the field of regional anatomy. The author of this book was formerly a prosector and demonstrator of anatomy at King's College, London. He has, therefore, been able to write a book in which the point of view of the student has always been kept in mind. Thus the text is in note form, and the diagrams, which the author

REVIEWS.

stresses as an aid to memory, are very clear and diagrammatic. The book will be of special use to the student, both before and after graduation. The book is so small that it can be easily carried round in the pocket. The author is to be congratulated on producing a book which is certain to be much sought by graduates and undergraduates alike.

PHYSICAL DIAGNOSIS.

Physical Diagnosis. By D. C. Sutton, M.S., M.D.; 1937. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary Limited. Royal 8vo, pp. 495, with 298 illustrations. Price: 30s. net.

No apology is required for a new book on the methods of clinical diagnosis. It is universally agreed that by far the most important step in clinical medicine and surgery is to examine the patient and elicit signs of disease. The more information that can be gained about the patient by the unaided senses, the better. The five fundamental principles of clinical examination, namely, history, inspection, palpation, percussion and auscultation, still prevail, and it is still true that more mistakes are made by not investigating than by not knowing.

Within limits it is desirable to dispense with adventitious aids to diagnosis as far as possible in the consulting room. It is fortunate that most of the effects of disease are observable by those who are willing to take the trouble and to use their five senses without the aid of elaborate apparatus.

This book is a comprehensive exposition of the methods of physical diagnosis, and no doubt reflects methods of teaching in the American school of medicine. The author is undoubtedly a sincere and earnest teacher, and has not been overawed by modern instruments of precision. Nevertheless, some of these are very fully considered, for example, the electrocardiograph and radiography.

A feature of the book is the introduction, which contains very sound and useful advice to the beginner. There is a most interesting chapter on the history of the methods of clinical medicine. Not a great deal of the matter in the book is original, but accepted methods of examination and observation are very clearly, concisely and attractively put before the reader.

As might have been expected in such a work, the illustrations play an important part. There are as a fact nearly 300 illustrations in the text, as well as some coloured plates. The production of the book by the well-known firm of C. V. Mosby leaves nothing to be desired, and we warmly recommend it to those engaged in teaching medical students as well as the medical students themselves.

A HISTORY OF ORTHOPÆDIC SURGERY.

A Source Book of Orthopædics. By E. M. Dick, M.A., M.D.; 1937. London: Baillière, Tindall and Cox. Medium 8vo, pp. 391. Price: 18s. net.

The author is an American orthopædic surgeon, and the book is a history of orthopædic surgery from the time of primitive man up to the present day. Not only is this work of historical interest, but the author has analytically surveyed most of the essential methods of current treatment. The book from this aspect may be regarded as a report on recent advances in orthopædic surgery, and reference is made to published articles of only a year or two ago. Naturally no detail is given, because it is assumed that the reader has a knowledge of orthopædic practice, and the author discusses with eclecticism all ancient and modern modes and established principles of the subject. This book, therefore, should be of great value to all orthopædists and surgeons interested in this growing branch of surgery. An important and extensive bibliography is included.

After considering primitive man, the author passes on to the important historical periods, such as the Renaissance, and, coming to the eighteenth century, he devotes attention to the numerous skeletal problems dealt with by the great John Hunter. After this come the chapters on the modern period based on

physiology, pathology and methods of practice. These chapters "should be read as they were written, with an appreciation of what went before. The term modern is used only in its chronological sense, and must cast no reflection upon the important contributions of the earlier centuries. Hippocrates applied methods of antisepsis and treated scoliosis; Galen sensed the circulation of the blood; a form of inhalation anæsthesia was used in the thirteenth century; de Chauliac used traction methods in fractures of the femur; Havers, Duhamel, Haller and Hunter studied the process of osteogenesis; Paré operated upon the spine; Leeuwenhoek saw cells in the human tissues; and Camper treated pes planus and hallux valgus."

In the discussion on the physiology of bone the important contributions of Havers (Haversian canals), MacEwan, Ollier, Wolff, Policard and Leriche, and Murk Jansen receive notice. The history of the use of plaster of Paris, of osteoclasts by Thomas, Lorenz and others, as well as other interesting historical diversions, are dealt with. Every page is both interesting and instructive, and the last part dealing with the modern period reflects the author's opinions. Here we find, for instance, that tendon transplantation, which has a definite place in the treatment of paralysis, especially in America and Europe, is carefully considered. Thus "if he is qualified, not by theoretic knowledge but by surgical practice, to perform a tendon transplantation with equal chance of success, then that operation is justified; if not, in most instances, except for surgery of the hand and fingers, operations on bone are more dependable. The choice between brilliance and dependability will always remain a matter of the surgeon's conscience." To write such a book the author, indeed, must have devoted a lifetime to the collection and study of his material. There are no illustrations. Amplification of the matter accumulated and set out by the author, especially if illustrated by old engravings, would have expanded the little book into a very large and more easily read volume.

GENETICS.

Elementary Genetics. By H. GRÜNEBERG; 1937. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 87. Price: 1s. 6d. net.

This book is one of the publishers' catechism series, and consistently with this is set out in the form of question and answer. This style, however, is little more than a concession to the required form, and the book really constitutes a brief summary of the science of genetics (including cytology). It is admirably clear, and covers the ground remarkably well for such a short book. There are very few figures, and this must make the part on cytology very difficult to those who have not a clear visual image of the chromosome dispositions in the meiotic phase. The book, however, is clearly meant for those who already have a general notion of the subject to which they desire to give greater precision. For this purpose it could hardly be better.

WORK AT THE MAYO CLINIC.

Collected Papers of the Mayo Clinic. Volume XXVIII, 1936; 1937. Philadelphia: W. B. Saunders Company. Crown 4to, pp. 1332, with 212 illustrations.

ALL phases of modern medicine and surgery are covered in the current volume of "Collected Papers", which mentions 723 articles published by various members of the staff of the Mayo Clinic.

Adson gives an admirable summary of the surgical treatment and prognosis of injuries of the peripheral nerves; also, in a paper written in conjunction with Hempstead, he advocates extensive resection of the cranial vault in cases of osteomyelitis of the skull spreading from the frontal sinus, as he has found that local drainage nearly always ends in recurrence.

G. T. Thompson describes the method, scope and low mortality of transurethral operations, and also has an interesting paper on urinary calculi. All the latest developments in mandelic acid therapy are covered by several papers.

A. Rivers summarizes the newer methods of treatment of peptic ulcer, and is not enthusiastic about "Larostidin".

A paper by McGowan, Butsch and Walters on the relations of pressure and pain in the common bile duct shows, experimentally, that morphine increases the intraductal pressure and the pain, and that relief of both is obtained rapidly by amyl nitrite, or more slowly by one one-hundredth of a grain of nitroglycerine. Case reports confirm this action in practice.

Boyer and Dixon have a most instructive paper on the physiology of the intestine, with experimental results of the action of the various drugs supposed to increase intestinal movements.

Braash and McDaniel expose the pitfalls which may be present and cause confusion in the diagnosis of filling defects in urograms.

J. Pemberton writes on reactions following thyreoidectomy for hyperthyreoidism, and, on theoretical grounds, advocates intravenous injections of 5% sodium citrate in 0.9% solution of sodium chloride, with 5 or 10 cubic centimetres of cortin added; 850 cubic centimetres are given, and the dose may be repeated.

There are several papers on experimental work on the adrenal gland.

Among the orthopædic papers, M. Henderson describes a new type of nail for the neck of the femur.

A valuable paper on the surgical treatment of 105 cases of diaphragmatic hernia by Harrington is well illustrated.

This year's volume is well up to the usual standard, and can be confidently recommended.

EXAMINATION OF THE URINE.

Clinical Urinalysis and its Interpretation. By R. A. KILDUFFE, A.M., M.D., F.A.S.C.P.; 1937. Philadelphia: F. A. Davis Company. Demy 8vo, pp. 435, with 40 illustrations. Price: \$4.00 net.

THE author states that "the primary purpose of the book is to present in a relatively concise form the subject of urinalysis from the standpoint of the physician, with particular reference to procedures feasible in the office laboratory". In this object he has been quite successful.

The book is divided into three parts. Part I is comparatively brief, and deals in an elementary manner with the functions of the kidneys and the composition of normal urine.

Part II constitutes the bulk of the book, and in the compass of twenty-one chapters covers all clinical aspects of urine examination.

The section dealing with the detection, estimation and significance of reducing substances in urine is particularly well compiled. The author emphasizes that the renal threshold for sugar is variable and an individual factor. Essential pentosuria is discussed in detail, and its importance as a possible source of a reducing substance in urine is indicated. The author favours the one-hour two-dose glucose tolerance test of Exton and Rose.

In discussing renal function tests Kilduffe rightly praises the value of the simple but useful concentration test of Fishberg. Although the urea clearance test is described, no reference is made to the valuable modification of this test introduced by Fowweather.

The bacteriological examination of urine and the urine tests used in the diagnosis of pregnancy are the subject of special chapters.

Laboratory workers in modern times may be called upon to report not only on the physical and chemical constitution of urine, but bacteriological and biological investigation of this excretion may be a source of most useful information.

The third section of the book is devoted to laboratory equipment and miscellaneous tables.

. The volume is a valuable addition to the literature of the subject, and as it describes technique in great detail it should be useful for students as well as for practitioners of medicine.

EXPERIMENTAL SURGERY.

A Textbook of Experimental Surgery. By J. Markowitz, M.B. (Toronto), Ph.D., M.S. in Experimental Surgery (Minnesota); 1937. London: Baillière, Tindall and Cox. Medium 8vo, pp. 227, 330 illustrations. Price: 31s, 6d. net.

The work of Dr. J. Markowitz is well known to those who have been interested in recent physiological work, and this book, which deals with many aspects of experimental surgery, is a most welcome as well as an instructive and interesting presentation of the subject. Although it cannot be used altogether as a work of reference, since, as is stated in the introduction, the writer has dealt only with procedures with which he has had personal acquaintance, it will nevertheless be found to be an excellent introduction to many aspects of the science of experimental surgery and, from the point of view of the beginner, will be found to be sufficiently complete.

The introduction is in itself a valuable presentation of the raison d'être of experimental surgery, and clearly indicates its relationship to clinical work. The author here emphasizes the necessity of physiological knowledge in surgeons and, indeed, this section at least should be read by clinicians. Although one may not agree with all the statements made, they present points of view which are most stimulating, and will probably be new to many surgeons. The occasional experimental observations, used to exemplify various statements, will be of interest and value to all those who are unable to keep abreast of this branch of modern surgery.

A shorter chapter is given on the anti-vivisection movement. Not only does it show that the social-aspect of animal experimentation is similar in America to what it is in other parts of the world, but it also furnishes some wise advice to those undertaking such work. The "evidence" taken during the hearing of a bill to prohibit experiments upon dogs in Columbia is a useful and instructive addition.

In the early chapters much necessary information, not appreciated by clinicians or anti-vivisectionists, and sometimes not even by the experimental surgeons themselves, such as that concerning the care and feeding of animals, methods of anæsthesia et cetera, is clearly given. The chapter on equipment and technique might well be read and digested by young and prospective surgeons, whether they propose to do experimental work or not.

In the subsequent chapters most of the parts of the body are dealt with, the greater part of the book, however, being devoted to consideration of the abdominal contents. The thoracic cavity, the cranial cavity, autonomic nervous system, bones et cetera, are discussed at some length. At the end of each section there is a good representative list of references which compensates for omissions in the text.

The book is well produced and the illustrations, almost all diagrammatic or semi-diagrammatic drawings, give a very clear idea of the author's meaning. At the same time the descriptions, given in a somewhat discursive form, are quite clear. The many technical points and ideas which to many will be new make the book well worth perusing even by those who do not propose to carry out this type of work. Altogether it is a useful addition to modern surgical literature.

RECTAL SURGERY.

The Principles and Practice of Rectal Surgery. By W. B. Gabriel; Second Edition; 1937. London: H. K. Lewis and Company, Limited. Royal 8vo, pp. 364, with 162 illustrations, including 17 plates (9 coloured). Price: 28s. net.

The second edition of "The Principles and Practice of Rectal Surgery", by William B. Gabriel, Surgeon to Saint Mark's Hospital for Cancer, has been published. The first edition of this work, based mostly on knowledge gained in Saint Mark's Hospital, filled a decided want, for it dealt in detail with those rectal conditions met with in everyday practice. The second edition contains some new chapters and some of the matter has been revised. The introductory chapter, written by the author in collaboration with Dr. V. Lloyd Davies, on "The Surgical Anatomy of the Rectum and

Anus", is new. In it will be found, in great detail and beautifully illus rated, a description of the various fasciæ of the pelvis, the pelvic blood supply as shown by vascular injection of substances opaque to X rays, and the pelvic nerve supply.

One of the new chapters, which is a mine of information on a disease which is most difficult to treat, namely, pruritus ani, should be read by every general practitioner. That part of the chapter in which the diagnosis and treatment of fungus infections which cause pruritus ani are discussed, is particularly valuable.

This book is full of practical information in regard to minor rectal ailments. The chapter on carcinoma of the rectum reflects the views of the staff of Saint Mark's Hospital on this subject. It should be noted that the author does not use spinal anæsthesia for the operation of rectal excision, because he feels that patients do not do so well following its use—an observation which other surgeons will confirm. He describes in detail the perineo-abdominal excision of the rectum in which, unlike most operators, he employs the Sims position to facilitate the perineal dissection of the rectum.

The book is illustrated with nine coloured plates and one hundred and sixty-two black and white illustrations, and is well printed. It is a book which every surgeon or general practitioner must, in the interests of his patients, possess.

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Proceedings of the Royal Australasian College of Surgeons.

HYDATID REGISTRY.

The following is the annual report of the Hydatid Registry of the Royal Australasian College of Surgeons for the year ending December 31, 1937, submitted by the Registrar-in-Chief, Sir Louis Barnett:

I have pleasure in submitting the annual report for the year ending December 31, 1937

The records on file now total 1,226, and the following table gives the location of the cysts and the mortality in the Australian and New Zealand cases, the deaths being given in brackets:

						Australian Cases.	New Zealand Cases,	Totals.
Liver Multiple almost Lung Muscles Spine Other bo Kidney Brain Spleen Heart Thyreoid Pancreas Breast Parotid Prostate	all wand i	rith pri	and	pelvic in liver	cysts	425 (50) 36 (5) 94 (5) 17 (1) 9 (2) 9 (1) 5 (4)	345 (52) 36 (4) 142 (10) 40 (1) 5 (1) 9 (1) 21 (4) 7 (3) 3 (1) 1 (1) 2	770 (102) 72 (9) 236 (15) 57 (2) 18 (3) 18 (1) 32 (6) 12 (3) 7 (1) 2 (1) 1 1
						611 (65)	615 (78)	1,226 (143)

It should be noted that very few records have come from Queensland, and none from Tasmania and Western Australia.

These records have already proved of decided help to a number of Fellows in providing clinical data for articles published in our own and other journals. It must, however, be borne in mind that accurate conclusions regarding incidence and mortality cannot be drawn from the Registry tabulations. By far the greater number of hydatid cases that occur are not recorded in the Registry, and follow-up notes regarding ultimate cures, recurrences and fatalities are very often lacking.

In my own work on incidence and mortality in New Zealand for the past forty-seven years, I have had to depend largely on public hospital statistics. When I started my Hydatid Registry work in 1930, I intended collecting at least 1,000 clinical records, which I would file, index, tabulate and store in suitable cabinets, then handing over the collection to the College reference library, hoping that it would be useful to Fellows engaged in the clinical study of hydatid disease. I felt that it was the duty of our College to encourage collective investigation of this parasitic malady, seeing that we live in the only parts of the British Empire where it is at all common. My total of 1,000 cases being more than achieved, I shall now send the records to our library at Melbourne, where they will be under the care of Mr. Julian Smith, junior, the Registrar of Surgical Records, and where they will be available for reference by anyone interested.

There are good hopes of a continued increase in the number and in the quality of these records, but only if the keen helpers do not lose their enthusiasm. Repeated appeals have to be made to get even moderate returns.

This year I wish to thank a particularly helpful colleague, Dr. S. H. Lovell, of Sydney, for the numerous records that he gathered, mostly from the Royal Prince Alfred Hospital, and personally transcribed for the Registry. Except for this notable contribution and another welcome series from Mr. T. F. Ryan, of Melbourne, the

Australian records this year have been unusually meagre.

Realizing that case records, when investigated for clinical research purposes, are often inadequate in their data and indeed sometimes absolutely useless, our College is taking steps (so far very slow steps) to remedy this weakness. My own opinion is that a great improvement in clinical records would result if Fellows showed more personal interest in the way their house surgeons made their case notes. House surgeons are usually willing workers, but they are not likely to spend much of their busy time over case records if their chiefs never look at them.

Among this year's records is one of unusual interest: a fatal case of hydatid

cyst of the heart which burst into the cavity of the left ventricle and plugged the abdominal aorta with hydatid $d \in Dris$. The case was reported from the Palmerston North Hospital (New Zealand) by the Medical Superintendent, Dr. J. H. North, F.R.A.C.S., and Dr. A. A. Pullar, the Pathologist, who intend publishing the case in this journal. Although several cases of hydatid disease involving the heart have been described in books and journals by Australian writers, there is only one other instance so far recorded in the Registry, and that is the one successfully operated on by

Dr. W. J. Long, of Bendigo.

In conclusion, I extend to all those who have sent me case records my own personal thanks as well as those of the College, and I wish again to acknowledge with gratitude and appreciation the valuable help I have received from the local registrars, Professor H. R. Dew, of Sydney, Mr. G. R. A. Syme, Mr. Julian Smith, junior, and Mr. H. G. Wheeler, of Melbourne, Mr. Ian Hamilton, of Adelaide, Mr. J. Fitzsimons, of Auckland, Mr. David Whyte, of Wellington, Mr. D. McK. Dickson, of Christchurch, Mr. Roland Fulton, of Dunedin, and also from the members of the original Hydatid Registry Committee, Sir Hugh Acland and Professor Gordon Bell. They have all borne with good nature the many inroads upon their time and energies that the Hydatid Registry has imposed upon them.

L. E. BARNETT, Hydatid Registrar-in-Chief.

ELEVENTH ANNUAL GENERAL MEETING.

The eleventh annual general meeting of the Royal Australasian College of Surgeons was held in Sydney from March 23 to 26, 1938. During the period of the meeting the Council of the College met on two occasions. The following business arising out of these Council meetings is published for the information of Fellows.

Honorary Fellowship.

When Mr. C. P. G. Wakeley, a member of the Council of the Royal College of Surgeons of England, was in Australia for the purpose of conducting the primary fellowship examination, the Honorary Fellowship of the College was conferred on him. by the Council.

Appointment of Executive Committee.

The following members of the Council were appointed an Executive Committee: Sir Hugh Devine, Sir Alan Newton, T. E. Victor Hurley, A. L. Kenny and Balcombe Quick.

Appointment of State and Dominion Committees.

The following appointments were made:

New South Wales: A. J. Aspinall, V. M. Coppleson, Professor H. R. Dew, B. T. Edye, J. W. S. Laidley, A. M. McIntosh and I. Douglas Miller.

Queensland: J. C. Hemsley, B. T. Mayes, H. S. McLelland, A. V. Meehan, W. N.

Robertson and Neville Sutton.

South Australia: A. M. Cudmore, I. B. Jose, L. C. E. Lindon, P. S. Messent, Bronte Smeaton and T. G. Wilson.

Tasmania: F. W. Fay, J. Bruce Hamilton and D. H. E. Lines.

Victoria: W. A. Hailes, Fay Maclure, J. Newman Morris, Henry Searby, C. Gordon Shaw, John H. Shaw and B. T. Zwar.

Western Australia: F. J. Clark, H. B. Gill and D. D. Paton.

Dominion of New Zealand: F. S. Batchelor, F. Gordon Bell, P. Stanley Foster, Sir Carrick Robertson, T. D. M. Stout and D. S. Wylie.

Appointment of State and Dominion Hospital Committees.

The following appointments were made:

New South Wales: A. J. Aspinall, A. S. D. Barton, T. Hamilton, C. B. Howse, J. W. S. Laidley, T. W. Lipscomb, I. Douglas Miller, J. S. MacMahon, Clarence Read, H. H. Schlink, J. C. Storey, Sir Robert Wade and C. E. Winston. Queensland: E. D. Ahern, J. C. Hemsley, A. E. Lee, A. V. Meehan, H. S. McLelland

and Neville Sutton. South Australia: A. M. Cudmore, H. M. Jay, I. B. Jose, Sir Henry Newland and

T. G. Wilson.

Victoria: A. E. Brown, Sir Hugh Devine, T. E. Victor Hurley, Fay Maclure, J. Newman Morris, Sir Alan Newton, C. Gordon Shaw, Henry Searby and B. T. Zwar. Western Australia: J. P. Ainslie, F. J. Clark and H. H. Stewart.

Dominion of New Zealand: F. S. Batchelor, F. Gordon Bell, P. Stanley Foster,

Sir Carrick Robertson, T. D. M. Stout and D. S. Wylie.

Admission of New Fellows.

The following new Fellows of the College were admitted by the Council:

General Surgery.

New Zealand: Walton Howorth Bremner, David Richmond Jennings, Patrick Arthur Treahy and Stanley Livingstone Wilson.

New South Wales: Gordon Bradley Lowe and Stanley Livingstone Spencer.

South Australia: James Estcourt Hughes and Sydney Krantz.

Victoria: Francis Patrick Morgan, Robert Milne Wishart and Reginald George Worcester.

Ophthalmology.

New South Wales: Frederick Gregory Roberts.

Laryr go-Otology.

Victoria: Charles Wason Nye and Roy Halford Stevens.

Gordon Craig Library and Library Service.

The Council wishes again to direct the attention of Fellows to the library facilities now available from the College Headquarters to Fellows resident in all States and in the Dominion of New Zealand. The following services will be rendered to Fellows, free of charge, on application.

Lending Library.—Fellows may receive on loan any text-book, monograph, journal

or reprint available at the College.

Translations.—Translations from foreign journals received in the library will be

supplied to Fellows free of charge.

Photostatic Copies.-Photostatic copies of articles and illustrations appearing in text-books, monographs, medical and surgical journals received at the College, will be

supplied to Fellows free of charge.

References.—References will be supplied to Fellows of the College who are writing Information concerning articles published on any particular subject or by any particular author will be given. Should the journal required not be obtainable in the College library, facilities are available whereby Fellows may be informed whether the journal they require is available in Australia and, if so, at what library.

Gordon Craig Scholarships.

The Council approved of regulations governing the award of scholarships to be made available from a portion of the income arising from the most generous bequest of the late R. Gordon Craig, one of the founders and one of the first members of the Council of the College. These regulations will, in due course, be published in the College handbook.

Deaths of Professor G. A. Buckmaster and Professor William Wright.

The Council noted, with great regret, the deaths of Professor G. A. Buckmaster and Professor William Wright, and directed that letters of sympathy should be forwarded to the widows. It will be remembered that both these gentlemen endeared themselves to all Fellows who were privileged to meet them on the occasions on which they visited Australia for the purpose of conducting the primary fellowship examination of the Royal College of Surgeons of England.

Prince Henry's Hospital Post-Graduate School of Surgery, Melbourne.

It was decided that the Prince Henry's Hospital Post-Graduate School of Surgery, Melbourne, should begin work immediately the new building at the hospital is completed. It is confidently expected that this building, providing facilities for the school, will be finished early in 1939.

Prince Henry Hospital Post-Graduate School of Surgery, Sydney.

The Council was very pleased to note the progress made with the establishment of the Prince Henry Hospital Post-Graduate School of Surgery in Sydney. It is the intention of the College to cooperate in connexion with the work of this school.

Fifteenth Annual General Meeting.

An application from the Tasmanian State Committee that the fifteenth annual general meeting should be held in that State in 1942, this being the year of the three-hundredth anniversary of the discovery of Tasmania, was approved.

ANNUAL BUSINESS MEETING.

The annual business meeting was held at the Hotel Australia, Sydney, on the evening of Thursday, March 24, 1938, at 7 o'clock.

Report of the Council.

The Council submitted the following report to Fellows of the College:

The Council submits to you the following statement of the College activities during the twelve months ended January 31, 1938:

Meetings of the Executive Committee.

The Executive Committee of the Council has met on twenty-eight occasions. The attendances were as follows: Sir Hugh Devine, 27; Sir Alan Newton, 28; Balcombe Quick, 22; T. E. Victor Hurley, 20; A. L. Kenny, 25.

Meetings of the Council.

Two meetings of the Council have been held since the tenth annual general meeting of the College. The attendances were as follows: Sir Hugh Devine, 2; Sir Alan Newton, 2; Balcombe Quick, 2; Sir Hugh Acland, 1; E. D. Ahern, 1; T. E. Victor Hurley, 1; A. L. Kenny, 1, Sir John McKelvey, 1; Sir Henry Newland, 2; H. R. G. Poate, 1; Sir Robert Wade, 1.

Number of Fellows of the College.

The number of Fellows is as follows:

4 77
17
541
55
8
13
634

Deaths of Fellows of the College.

The Council regrets to report the deaths of the following Fellows: D. A. Cameron (Queensland), D. N. Eppstein (New Zealand), A. M. Lazarus (Victoria), Felix Meyer (Victoria), Brooke Moore, senior (New South Wales), W. A. Ramsay Sharp (New South Wales), R. G. Scott (Tasmania), J. Stevenson (New Zealand), R. St. Clair Steuart (Victoria).

Primary Fellowship Examination.

The primary fellowship examination of the Royal College of Surgeons of England was held in Melbourne, Sydney and Dunedin in November and December, 1937. The result of the examination was as follows:

		A	pprove	d.	Deferred	1.	Total.
Melbourne	 	 	17		18		35
Sydney	 	 	3		3		6
Dunedin	 	 	7		7		14

The Director of Examinations of the Royal College of Surgeons of England has expressed disappointment at the very small entry in Sydney. At present discussions are taking place between the two Colleges concerning a change in the conditions of the examination, so that, if possible, a more accurate estimate of the number of candidates who propose presenting themselves at the examination may be obtained. In all probability, payment of the examination fee when the entry is first lodged will be insisted upon in the future.

Prince Henry's Hospital Post-Graduate School of Surgery.

On August 31, 1937, the Prince Henry's Hospital Post-Graduate School of Surgery was opened by Professor G. Grey Turner, Professor of Surgery at the British Post-graduate Medical School. Professor Grey Turner delivered an address entitled "Surgical Post-Graduate Education".

Work has begun on the erection of the new central block at the hospital in which will be accommodated the beds connected with the school. It is estimated that this work will be completed about the end of this year and the school will then immediately

begin to function.

The Gordon Craig Library.

In January, 1938, Fellows were advised of the facilities available in the Gordon Craig Library, and it is hoped that they will make full use of the services which have been placed at their disposal. The library has now been converted from a reference to a lending library. Translations from foreign literature received in the library will be supplied to Fellows on request, and photostatic copies of articles published in any text-book, monograph or journal received, will be made available. References are also being supplied to those Fellows requiring them. From time to time, library circulars are issued so that Fellows may be kept in touch with new works received.

The cooperation of Fellows is asked for in supplying missing numbers of journals. The Council is anxious to complete a number of sets of surgical journals, the current numbers of which are now being regularly received. Lists of journals required in the

library are published in the library circular at frequent intervals.

Gratitude is felt to the following Fellows and friends of the College who have donated books to the library: Mrs. Rudyard Kipling, Mrs. Jeffreys Wood, Sir Hugh Devine, Sir Alan Newton, Sir Alfred Webb-Johnson, Professor G. Grey Turner, Dr. A. R. Morton, Dr. T. W. Thwaites, Dr. W. Ernest Jones, R. D. McKellar Hall, A. C. F. Halford, G. H. Hogg, A. L. Kenny, E. S. J. King, Balcombe Quick, and G. R. A. Syme.

Gordon Craig Scholarships.

An announcement will shortly be made concerning scholarships which will be made available from the income arising from the bequest received from the late R. Gordon Craig. Regulations governing the award of these scholarships will be published at an early date.

Journal.

From time to time expressions of appreciation of the "Surgery in Other Countries" section in The Australian and New Zealand Journal of Surgery have been received. Realizing the possibility of bringing the results of work in foreign countries under the notice of Fellows of the College, an arrangement has been made with Masson et Cie, the publishers of Journal de Chirurgie, whereby the College has acquired the right to publish translations of articles appearing in the "Analyses" section of that journal. In this latter section are published records of the work of surgeons and research workers in all foreign countries.

Ryan Scholarships.

The Michael and J. P. Ryan Scholarships for 1937 were won by Dr. M. M. O'Brien and Dr. M. F. A. Woodruff respectively. The examiners were T. F. Ryan (Chairman), T. E. Victor Hurley and C. Gordon Shaw.

Evening Meetings at the College.

The following evening meetings were held at the College Headquarters:

1. The Hamilton Russel Memorial Lecture was delivered by Sir C. Stanton Hicks, of Adelaide, on May 28, 1937. The subject was "The Physiology of Acute Circulatory Failure due to Hæmorrhage and Shock".

A symposium on "Problems in Appendicitis" was held on July 30, 1937.
 The Annual Victorian Lecture was delivered by Professor G. Grey Turner on September 2, 1937, his subject being "Some Aspects of Œsophageal Surgery".

State and Dominion Annual Meetings.

The following State and Dominion annual and evening meetings were held:

New South Wales: Evening meeting on June 30, 1937; evening meeting in September, 1937; annual meeting in December, 1937.

Queensland: Annual meeting on August 11 and 12, 1937. South Australia: Annual meeting on November 2, 1937. Tasmania: Annual Meeting on November 5, 6 and 7, 1937.

Victoria: Half-day meeting on June 4, 1937; annual meeting on September 1 and 2, 1937; half-day meeting on November 5, 1937.

Western Australia: Annual meeting to be held in April, 1938.

New Zealand: Annual meeting held in Wellington in September, 1937.

Royal Australasian College of Physicians.

A reciprocal arrangement has been made between the Royal Australasian College of Physicians and the College whereby the former body will make available to the College whatever office accommodation may be required in Sydney and, similarly, the Royal Australasian College of Physicians will be given whatever office facilities it desires in the College building in Melbourne.

The Hospitals Commission of New South Wales.

On receipt of advice that the College had been granted representation on the Hospitals Appointments Advisory Subcommittee of the Hospitals Commission of New South Wales, H. R. G. Poate was appointed as the College representative.

Gifts to the College.

The Council of the College is indebted to the following donors who have generously made gifts to the College: Mr. C. P. G. Wakeley (a number of instruments belonging to the late Lord Lister) and Mrs. Champ (a pewter syringe, formerly used at the Port Arthur Convict Settlement, Tasmania).

Award of Street Architecture Medal.

The College architects and the College were honoured by receiving the award for 1937 of the Royal Victorian Institute of Architects for the best building constructed in Melbourne during the previous three years. A bronze plaque recording the award is to be affixed to the building in the near future.

Council Election.

F. P. Sandes indicated that he did not seek re-election to the Council and therefore did not renominate. The Executive Committee greatly regretted this decision, as it realized that the Council would be deprived of the advice and guidance of one of the founders of the College who took a leading part in New South Wales at the time when the idea of forming a Royal Australasian College of Surgeons was first conceived. In February, 1926, he was a member of the Federal Committee of the British Medical Association which met in Melbourne for the purpose of discussing the desirability of founding the College. At this meeting it was decided that Professor Sandes should call a meeting of the Surgical Section of the British Medical Association in Sydney. He was also requested to prepare an exordium for consideration at this meeting. He prepared the exordium and thus performed a work for the College the value of which will last for all time. The exordium forms the basis of the present constitution. The Executive Committee, the Council and the general body of Fellows are grateful to F. P. Sandes for this work. F. P. Sandes has been a member of the Council of the College since its inception. It was with feelings of great regret that members of the Executive Committee learnt that he had declined to seek re-election, owing to his belief that he should stand aside to enable new men to take an active part in College administration.

The following were elected as members of the Council: E. D. Ahern, George Bell, T. E. Victor Hurley, A. L. Kenny, Sir Henry Newland and Balcombe Quick.

The report was unanimously adopted.

H. G. WHEELER, Secretary.

Balance Sheets and Accounts.

Both the general balance sheet and the Craig Endowment balance sheet at January 31, 1938, were submitted to the meeting. It was unanimously resolved that the general balance sheet and the Craig Endowment balance sheet be adopted.

The balance sheets are published hereunder for the information of Fellows.

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS. Balance Sheet as at January 31, 1938.

LIABILITIES.	4	-	4		ASSETS.	G		4	9
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T. F. Ryan Endowment Fund Michael Ryan Scholarship Income Account J. P. Ryan Scholarship Income Account	5,100 8 8 0 9 8 8 0 9 8 8 0	02101	9 9		1	5,986 15 1	+10	13,916	9
Surplus Account— Surplus, January 31, 1937 Add Transfer from General Endowment Fund	17,726 0 0		9,116		Sundy Deposits Land and Buildings—at cost Furniture and Fittings—at cost—fees depreciation. Great Mace—at valuation Library—at cost			25.5 25.5 30.5 31.5 31.5 31.5	N2000
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Craig Endowment Fund (as per separate Balance Sheet)		4	5,490	11 7 064,81					
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L. E. BARNETT, President, BALCOMBE QUICK, Honorary Treasurer. H. G. WHEELER, Secretary.

Audited and found correct.
YOUNG & OUTHWAITE,
Chartered Accountants (Australia),
366 Collins Street, Melbourne, C.1.,
February 15, 1938.

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS. CRAIG ENDOWMENT.

Balance Sheet, January 31, 1938.

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£45,490 7 11

Audited and found correct.
YOU'NG & OUTHWAITE,
Chartered Accountants (Australia),
368 Collins Street, Melbourne, C.1. February 15, 1938.

L. E. BARNETT, President. BALCOMBE QUICK, Honorary Treasurer. H. G. WHEELER, Secretary.

HALF-DAY MEETING ARRANGED BY THE COMMITTEE FOR THE STATE OF VICTORIA.

A HALF-DAY MEETING for the State of Victoria was held at Saint Vincent's Hospital, Melbourne, on Friday, June 17, 1938, at 2 p.m. The following programme was presented: Operations by-

J. F. Mackenzie: 1. Operation for Paget's disease. 2. Operation for osteoarthritis. C. Gordon Shaw: 1. Arthroplasty of the hip for coxa protrusa. 2. Subtrochanteric osteotomy for fracture of neck of femur.

Leo Doyle: Excision of the stomach.

F. J. Colahan: Thoracoplasty for tuberculous disease of the lung.

R. F. O'Sullivan: Hysterectomy. Charles Osborn: Cholecystectomy under high spinal anæsthesia.

Thomas King: Bone graft for ununited fracture of the tibia.

F. Morgan showed neurosurgical cases.

WESTERN AUSTRALIAN ANNUAL MEETING.

For the first time since the foundation of the College a representative of the Council has visited the State of Western Australia. Sir Hugh Devine, at the request of the State Committee, visited Perth from March 31 to April 4, 1938.

During his stay he was given opportunities to acquaint himself with the standard of surgery practised in this State, and with the difficulties and disabilities under which surgical practice is conducted.

His lectures were thrown open to all members of the medical profession who wished to attend, and were well attended by both metropolitan and country practitioners, as well as Fellows.

The first lecture was more in the nature of a talk during the screening of a cinematograph film of "Excision of the Rectum". This was the first occasion on which this film had been shown, and the demonstration was an unqualified success. method shown of removal of the rectum had already been described at length in The British Journal of Surgery, but the cinematograph display so demonstrated its advantages over other methods, both in time saving and effectiveness, that Sir Hugh was inundated with questions over a long period.

The next lecture, illustrated with lantern slides, described the use of "Local Anæsthesia in Herniorrhaphy", and was followed by a similarly illustrated lecture on "Gastric Exclusion"

The method adopted by the lecturer of sitting in the audience and describing each slide as it was shown, had a great deal to commend it, as questions and answers were more free and informal than is usual under the generally adopted procedure, and in every case the audience benefited as a result of this departure from accepted custom.

On Friday evening, April 1, Sir Hugh delivered a lecture in the Winthrop Hall of the University of Western Australia. This was an academic function such as is usual during College meetings in other States, and was presided over by the Chancellor of the University and was attended by the Lieutenant-Governor, Sir James Mitchell, and Lady Mitchell. The audience consisted of representatives of all the professions and of the University, and also of leading citizens and representatives of public bodies throughout the State.

After a formal expression of gratitude for the opportunity to address such a gathering, the lecturer described the foundation of the College and its objects and He also stressed the need for such an institution in the Commonwealth of Australia and Dominion of New Zealand, stated its relationship to the universities and other teaching bodies, and described the post-graduate educational facilities it provided for the profession and the benefits which must accrue to the public therefrom. After the lecture a reception was held in the Winthrop Hall.

On the evening of April 2 the annual College dinner was held and was attended by sixteen Fellows, most of the absentees being out of the State. After this dinner, general business was discussed, and an assurance was given by Sir Hugh that official visits to this State by representatives of the Council would be frequent in future years.

On Sunday, April 3, Sir Hugh, accompanied by the members of the State Committee and several other Fellows, attended one of the regular meetings of the Eastern Districts Branch of the British Medical Association at Northam. During this visit Sir Hugh gave an illustrated talk on innumerable useful points in surgical practice likely to be helpful to country practitioners. This talk was warmly appreciated by those present at the meeting, many of whom had travelled several hundred miles to attend.

Sir Hugh Devine's visit to the State terminated by his departure for England on April 4.

VICTORIAN EVENING MEETING.

On the evenings of Thursday, June 30, and Thursday, July 7, 1938, lectures were delivered at the College by Fay Maclure, on the subject of "Mechanical Principles in Causation and Treatment of Disease".

Motices.

THE BRITISH POSTGRADUATE MEDICAL SCHOOL.

THE College wishes to draw attention to the announcement of the British Postgraduate Medical School on page xxxii of the advertisements.

NEW DEVELOPMENTS IN SURGICAL EQUIPMENT.

The attention of Fellows is drawn to pages xx and xxviii among the advertisements, which illustrate some recent developments in surgical equipment. The Editorial Committee is responsible for the selection of the equipment illustrated thereon. The publishers will be pleased, whenever possible, to supply the names and addresses of the manufacturers to anyone requiring such information.

Editorial Motices.

EDITORIAL communications should be addressed to the Chairman of the Editorial Committee, 57 Collins Street, Melbourne, or to any member of the Editorial Committee. It is understood that original articles forwarded for publication are offered to The Australian and New Zealand Journal of Surgery solely, unless the contrary be stated.

Reprints can be supplied at cost price; the minimum number is fifty copies. Orders for reprints must be given when the proof is returned.

Exchange journals should be addressed to the Honorary Librarian, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, Victoria, Australia.

Business communications and remittances should be addressed to Butterworth and Co. (Australia) Ltd., 8 O'Connell Street, Sydney.

